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This report is an evaluation of "Art for the Elementary Teacher" and "Science for the Elementary Teacher," televised inservice teacher education courses produced by the University of New Hampshire in conjunction with Supervisory Union *21, Hampton, New Hampshire, under Title III of the Elementary and Secondary Education Act. Characteristics of the enrollee, the lessons, and individual gain in knowledge about the content of the program over time are evaluated for both Phase 1 (Art) and Phase 2 (Science) of the inservice program. Appended are copies of teacher inventories, course evaluation surveys, review tests, and item analysis data. (SG)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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An Evaluation Report

IN-SERVICE TEACHER EDUCATION COURSES IN ART AND SCIENCE FOR THE ELEMENTARY TEACHERS OF NEW HAMPSHIRE

Supervisory Union #21, 86 High Street, Hampton, N. H. 03842

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However, the opinions expressed herein do not necessarily reflect the position of the U. S. Office of Education and no official endorsement by the U. S. Office of Education should be inferred.

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Dr. Albert R. Elwell
Dir., Research and Development
Bureau of Educational Research
and Testing Services

ERRATTA

Page 3, paragraph 1:	Claremont participant-instructor ratio reduced to 55:2 through establishment of an additional instructor position following receipt of enrollment data.
Page 21, paragraph 2, line 2:	Delete "The art teacher or...."
Page 23, paragraph 2, line 6:	Delete "in the implemented"

I. PHASE I - ART

A. CHARACTERISTICS OF THE ENROLLEE

The Teacher Inventory, a basic biographical data questionnaire, was developed to assess the demographic, social and professional characteristics of the Title III participants. As it appears that it would be helpful to "know" the typical enrollee of the art workshop for elementary teachers, the following characteristics were generated from the Teacher Inventory data to depict the "average" enrollee:

> The enrollee is a female resident of New Hampshire and is employed in a rural or small town school system. She is forty-two years of age and a first-grade teacher with twelve years of teaching experience in the elementary school. Our enrollee holds a teaching certificate of the State of New Hampshire and was graduated with a certificate degree from a school, college or university. She has enrolled in the program to improve her knowledge of the subject matter relative to the teaching of art in the elementary school, rather than with the intent of acquiring academic credit toward an advanced degree. Our teacher had completed two basic courses in art while pursuing her undergraduate degree, but has not completed supplementary art courses subsequent to the granting of her certificate. Her principal objective for enrolling in the program is to get ideas for developing a "creative art" program as a part of the regular classroom activity.

The above characteristics are perhaps quite applicable to the image of the elementary school teacher in rural New Hampshire. We find, for example, that most of the teachers at the elementary level view teaching as a contingent rather than a career occupation, that is, they tend to pursue teaching upon graduation from college, drop out of the profession in order to "raise their children", and then return to the teaching profession when their children reach school age. Thus, it is not at all uncommon to find our elementary teachers to be 'forty-two years of age' and possessing 'twelve years of teaching experience'. Additionally, we find that, in general, most elementary teachers - especially those associated with rural or small-town school systems - return to the college classroom to "up-date" themselves in terms of new developments in curriculum and instruction, but rarely do they pursue such study with the intent of an advanced degree.

As it is usually dangerous to generalize characteristics of the "typical" teacher from basic statistical data, the components from which our enrollee was generated are presented in Tables I-IX together with some observations concerning the significance of the findings.

Enrollments by Center. The data in Table I clearly indicate a wide range of enrollments by center. Perhaps the principal explanation for this occurrence is that formal registration for a course, usually does not occur until the first actual meeting of participants and instructors. Thus, it is impossible to predict, other than intuitively, the actual enrollment of any center. Several critical problems are inherent in such a system; namely, (a) some centers are over-enrolled - that is, too many students for a given instructor in a "work-type" course - while other centers are under-enrolled, (b) the lack of adequate enrollment projections of a preregistration program create a major logistics and material problem, especially in terms of a project such as art and science instruction, since the "success" of the project is heavily dependent upon the availability of materials for instructional purposes, and (c) the rural-geographical features of the State require program planners to select potential center sites on a regional basis, although the actual enrollments at these centers may vary considerably as noted by the data in Table I.

TABLE I -- Enrollments by Center*

Center Code	Center	Enroll-ment	% Total	Center Code	Center	Enroll-ment	% Total
712	Claremont	55	16.6	740	Salem	22	6.6
714	Concord	30	9.0	744	Hampton	22	6.6
718	Farmington	15	4.5	749	Lebanon	26	7.2
719	Franklin	22	6.6	756	Dover	14	4.2
727	Manchester-1	33	9.9	759	Keene	15	4.5
729	Nashua	29	8.7	767	Manchester-2	17	5.1
734	Portsmouth	32	9.6		TOTAL	332	
					Mean	25.5	

*Total enrollment figure represents participants for whom valid Teacher Inventory data were available; formal enrollment data, available from University Extension Services.

Although it is acknowledged that the geographical features of the State essentially dictate selection of representative centers on a regional basis, it is suggested that the Project Director and the Extension Services attempt to increase the precision by which enrollment projections are established. It is further suggested that the problems of enrollment procedures and the availability of materiel be resolved for future programs of this nature, and that serious consideration be given to limiting enrollments to a maximum of 30.1 participant-instructor ratio to enhance both interpersonal and program objectives.

State of Residence. Although the primary intent of the program was to provide advanced instruction in elementary art for the teachers of New Hampshire, the geographical boundaries of the State are such that such a program could and should be of benefit to residents of "border" areas. That this objective was accomplished may be illustrated by the Residence data presented in Table II.

TABLE II -- Residence

State of Residence	N	% Total
New Hampshire	293	88.3
Vermont	22	6.6
Maine	10	3.0
Massachusetts	6	1.8
Maryland	1	0.3

The border communities of Vermont were served by the Claremont (N=14) and Lebanon (N=8) centers. Of interest here is that the enrollment of Vermont participants represented 25.4% of the total enrollment of the Claremont center which, incidently, was clearly over-enrolled with it 55:1 participant-instructor ratio. Although the Lebanon center cannot be considered as having been over-enrolled (N=26), the Vermont-based participants did account for 30.8% of its total enrollment. Of additional interest is that all ten enrollees from Maine school systems were absorbed by the Portsmouth center and represented over thirty percent of its total enrollment. Enrollees from Massachusetts communities were served by the centers at Salem (N=3), Nashua (N=1), and Hampton (N=2), and in no way affected the total enrollments of these centers. The one remaining out-state participant, a resident of Maryland on leave in New Hampshire, was served by the Concord center.

It seems important that, for future planning, the workshop director and staff attempt to achieve a workable solution to the registration of out-state teachers and particularly where their participation may have an adverse effect on the size of enrollment at individual centers. We are not suggesting, however, that out-of-state residents be restricted from actively engaging in the program, but we are concerned that administrators of the workshops take the necessary steps to provide adequate instructual and logistic support for all participants.

Age. As was noted earlier, teachers in a rural area such as New Hampshire typically view the profession within a contingent, rather than a career-oriented framework. Thus, we find that several characteristics of major importance to education in New Hampshire are revealed when the participants are categorized by age, as in Table III.

Table III -- Age

Age Range	N	% Total	Age Range	N	% Total
20-25	58	17.5	46-50	45	13.6
26-30	28	8.4	51-55	56	16.9
31.35	31	9.3	56.60	42	12.6
36.40	25	7.5	61-65	19	5.7
41-45	26	7.8	66-70	2	0.6

The most outstanding aspect of these data is the dimensioning of the participants into three relatively distinct age-groups - those under 25 years of age, the 26-45 group, and those above 45 years. The younger group accounts for 17.5% of the total sample, while the next category (i.e., 26-30) represented on 8.4% of the enrollees. The 46-50, 51-55, and 56-60 groups approximate (in percentage) the "younger" teachers.

These data suggest several possible explanations for the occurrence of "age-class" among our teachers. First, it is apparent that the younger teachers are active in the profession until age twenty-five at which time they (a) temporarily "retire" from the profession to raise their families, or (b) tend to migrate to other states and communities to which they are drawn by higher salaries and professional advancement. Secondly, we find a relatively larger segment of our teachers becoming active in the profession between the ages of forty-six to sixty, followed by a very marked drop in professional employment in the sixty-one-plus age group. The mean age of our participant was a high 42.4 years.

Although it can only be inferred from these data, together with our conversations with workshop participants, it can be said that the technological worth of ETV is extremely important in a rural area such as New Hampshire. The geographic locations of the University system - Durham, Keene and Plymouth-almost prohibit post-graduate study in that distances between such centers as Lebanon and Concord, for example, make it extremely difficult for a teacher to pursue study in an "on-campus" environment. As the Title III program and WENH-TV facilities are expanded to include the "north-country" - communities such as Berlin and Littleton - the value of ETV is providing educational information and services to these communities located over 100 miles from the nearest campus, will be of particular significance to the development and maintainance of quality education in the state. We might also hypothesize that these services will contribute effectively to the educational programs of communities in southern and western Maine, northern Massachusetts, and all along the New Hampshire-Vermont border since the WENH-TV network is in a more advantageous geographical proximity to these areas than are similar facilities in Maine, Massachusetts, and Vermont. It will be possible, therefore, to "take the programs to the people" rather than require teachers to travel great distances in order to upgrade their teaching techniques and materials. These objectives seem especially crucial in light of both the geographic and the family-age factor noted above.

Teaching Experience. Data relative to the number of years of teaching experience parallel the age factor noted previously. The mean age of workshop participants (42.4) is "matched" by the 12.5 years of teaching experience for the average enrollee. It is interesting to note that the number of enrollees with an excess of thirty years of teaching experience (5.7%) exceeds the percentage of enrollees who are beginning teachers in New Hampshire regional school systems (4.8%).

TABLE IV -- Number of Years Teaching Experience

Years Teaching	N	% Total	Years Teaching	N	% Total
No Response	8	2.4	11-15	44	13.2
Beginning	16	4.8	16-20	38	11.4
One	30	9.0	21-25	29	8.7
Two	17	5.1	26-30	27	8.1
3-4	35	10.5	31-35	10	3.0
5-6	19	5.7	36-40	7	2.1
7-8	23	6.9	41+	2	0.6
9-10	27	8.1			

These data clearly indicate that the Title III program served an older and experienced teacher. Although the factors of age and teaching experience will be of significance in later sections of this report, to comment further at this time would be redundant.

Role and Grade Level (s). The major target-group for this project was the classroom teacher in Grades 1-4 where art is a significant segment of the total curriculum. As can be seen from the data in Tables V and VI the program focused successfully on this group. The majority of the enrollees (59.7%) were assigned to Grades 1-4 with single grade-level responsibilities, an additional 22.8% were responsible for art programs in Grades K and 5 or in multiple-level grades within the K-5 range. Of some significance is that 14.2% of the teachers were responsible for multi-level grades, while 76.5% were assigned to single grade levels in the K-6 range.

TABLE V -- Present Role in School System

Major Role	N	% Total
No Response	4	1.2
Substitute	18	5.4
Teacher	300	90.4
Supervisor	3	0.9
Principal	7	2.1

TABLE VI -- Major Grade Level (s) Assignment

Grade Level (s)	N	% Total	Grade Level (s)	N	% Total
No Response	26	7.8	Grades 1-6	6	1.8
Kindergarten	20	6.0	1-7	1	0.3
Grade 1	62	18.7	1-8	6	1.8
2	54	16.3	1-9	4	1.2
3	44	13.3	2-5	1	0.3
4	38	11.4	2-6	1	0.3
5	23	6.9	3-4	2	0.6
6	13	3.9	4-6	1	0.3
7	0	0.0	5-6	8	2.4
8	4	1.2	5-8	3	0.9
9	1	0.3	6-8	3	0.9
Grades 1-2	2	0.6	7-8	7	2.1
1-4	2	0.6			

We might also note that only three enrollees (0.9%) served as supervisors of elementary art programs. This factor can only serve to support to proported need for consultants to assist in the development and maintenance of art programs (and other specialized areas, such as science, music, pupil personnel and guidance). Teachers in the region must rely on (personally) acquiring the knowledge and skills necessary to provide quality instruction and guidance to their pupils. This reality is a major regional problem which must receive attention in the near future if we are to even expect to maintain the present level of quality instruction at all levels of our educational system.

Professional/Academic Achievement. The professional and academic achievement of the enrollees bear special consideration. Although the academic "rating" of the workshop included a graduate level course designation, we found that few of the participants (25.6%) viewed the Title III program as directly contributing to their professional advancement in terms of an advanced degree. For example, less than ten percent of the enrollees were candidates for an M. A. degree, and only 7.5% planned to utilize the Title III experience as a "legally applicable" graduate course. These data are presented in Table VII.

TABLE VII -- Academic/Professional Achievement

Degree Now Held	N	% Total	Degree Now Engaged	N	% Total
No Response	68	20.5	No Response/None	247	74.4
A. B.	63	19.0	M. A.	33	9.9
A. M.	4	1.2	Adv. Certificate	24	7.2
B. S. Ed.	81	24.4	Doctoral	1	0.3
Ed. M.	10	3.0	Other	27	8.1
Other	106	31.9			

What may on the surface appear to be a lack of orientation toward professional advancement via an advanced degree is explained, at least in part, by a combination of several factors: (a) 52.4% of the enrollees held only the equivalent of a teaching certificate - without a formal bachelor's degree, (b) data from Age-and Teaching Experience factors noted previously suggest that the majority of the enrollees held the equivalent of a provisional certificate or a similar document granted following completion of a program of study at a "normal school"; (c) it is generally not considered economically feasible to pursue a bachelor's or advanced degree, especially in light of age, tenure, and the very liberal certification requirements of the State of New Hampshire, and (d) to formally pursue either a bachelor's degree or graduate study is an extremely difficult proposition that would require considerable travel, time, and typically unrewarded expense. Thus, most teachers in rural New Hampshire (i. e., New Hampshire has, by federal standards, only one city, that being Manchester, and very few populous communities within fifty miles of its borders)are quite content to pursue teaching - either as a contingent or professional occupation - without too much concern for certification requirements, small-scale salary increments as a stimulus for graduate study, or the typical pressures to "up-grade" their formal preparation. Most elementary teachers in the region would much rather and do pursue knowledge concerning innovative techniques and materials, but they choose to gain this knowledge on a personal, rather than reward-oriented basis.

Formal Preparation in Art. Again, as a plausible result of the now-obsolete normal school curriculum - coupled with more contemporary teacher preparation programs - the vast majority (72.6%) of the enrollees had completed at least one formal academic course in the area of art in the elementary school. As was true in examining the degree-oriented data, we find in Table VIII that most elementary teachers were adequately prepared at the "undergraduate" level, but demonstrate little formal interest in pursuing art at the graduate level.

TABLE VIII -- Undergraduate and Graduate Preparation in Art

Undergraduate Art Course (s) Completed	N	% Total	Graduate Art Course (s) Completed	N	% Total
None	91	27.4	None	313	94.3
Yes	241	72.6	Yes	19	5.7
One Course	88	26.5	One Course	14	4.2
Two	69	20.8	Two	1	0.3
Three	30	9.0	Three	1	0.3
Four	9	2.7	Four	0	0.0
Five	6	1.8	Five	0	0.0
Six	4	1.2	Six	0	0.0
Seven	1	0.3	Seven	0	0.0
Eight+	2	0.6	Eight+	1	0.3
Other	14	4.2	Other	2	0.6
No Resp.	18	5.4	No Resp.	0	0.0

Enrollee Objectives: A major segment of the Teacher Inventory was devoted to the assessment of enrollee objectives in pursuing the Title III workshop experience. Our primary interest in providing each participant with a checklist of items of this type was two-fold: (a) to assess responses to item-types or statements that are commonly forwarded as reasons for "needing" a course such as 'art for the elementary teacher', and (b) to assess the expectations of the participants vis a vis what they "want" from the course and what they felt they had gained from the experience - in a sense, reality-testing.

The thirty items presented were representative of several major categories of proported needs and ranged from purely "information and materials" types to those items mainly concerned with methodological and historical considerations. (A complete list of these items is presented on page three of the Teacher Inventory which is included in the Appendix of this report.) Each enrollee was asked to "check five reasons why (you) enrolled in this art course" and was not required to rank-order the thirty items.

First we wanted to know how "far" down the list the enrollees proceeded before checking their first objective. In designing the checklist we had rank-ordered the items on the basis of our prior experience with the instrument with elementary teachers, and felt that the "first rating" would be of importance, followed by the second checked item, third, fourth, and fifth item. Secondly, we also wished to examine the "cumulative frequency" of each item-check along the five-choices continuum since we had found that quite often the teachers had reversed the process of "checking from item one to item thirty and stop" because they had perceived that the instrument focused on several concepts - especially "creative art" - which were of some contemporary significance.

As can be seen from the data in Table IX, enrollee responses channeled on the concept of creative art and along its component dimensions of concept, program, motivation, materials and techniques, and affect. The varying positions of these items - ranging from 02 to 27 in order of presentation - tends to support our feelings that the teachers were searching for and expecting "answers" to the creative arts issue. It is of further significance that the principally selected items (14 and 22) focus directly on creativity despite their location in the order. The major item-types rejected (i. e., low incidence of stated objective) were those pertaining to directed programs and activities, and those of historical or traditional significance, such as "great artists" and "collage-making".

TABLE IX -- Principal Objectives for Enrolling in Course

Item	Objective	N Rate 1st	N Rate 2nd	N Rate 3rd	N Rate 4th	N Rate 5th	Cumulative N Total	Cumulative % Total
14	To get ideas for developing a "creative art" program as part of the regular classroom activity.	77*	123	38	9	7	254	76.5
22	To learn more about working with children in "creative art."	0	3	40	90	59	192	57.8
18	To learn more about composition of materials on a bulletin board.	1	25	70	39	17	152	45.8
02	To learn more about what standards to apply to children's art.	136*	12	0	1	0	149	44.9
27	To learn how to use media and materials to stimulate artistic expression.	0	0	6	13	126	145	43.7
19	To get some "feel" for being able to work in "art".	1	15	40	53	14	123	37.0
15	To learn more about design and be able to apply this learning in my classroom.	5	29	34	11	1	80	24.1
25	To learn more about "directed" art lessons.	0	0	2	35	23	60	18.1

* These items selected as "priority" needs; next highest N for first rating was N=48, followed by N=15, and the % total for these items did not exceed 15%.

It is perhaps a fair assumption to state that the enrollees' interests and objectives for participation in the workshop were precisely to "up-date" themselves in a specific area of the art medium - creativity. As we shall note later in this report the teachers were not interested in such areas as "motivation", "teacher role", "evaluation" of art in general, or "art appreciation". We would tend to accept that most of the enrollees - in terms of age and years of teaching experience - felt more than competent in their abilities to motivate their pupils or to understand their role in the classroom.

B. LESSON EVALUATIONS

The concern with evaluating each segment of the televised programs and their concomittant instructional programs led to the development of a standard Course Evaluation Survey for the fifteen content areas of the instructional sequence. (cf. Appendix B) Each of these "lessons" was presented in four sections- The Television Lesson, The Study Guide, The Work Session, and The Classroom Follow-Up. The value of these sections to the participants were assessed by items to which workshop enrollees were to respond on a four-point scale. In order to quantify these responses for purposes of analysis, the response scale was equated to an objective scale according to the scheme noted below:

Response Scale	Value	Objective Scale
Strongly Agree	4	Very Favorable
Agree	3	Favorable
Disagree	2	Unfavorable
Strongly Disagree	1	Very Unfavorable

Results of the fifteen lesson evaluations are presented for each of the four sections of the instructional program. No effort has been made to assess the statistical significance of these data since our primary interest was to acquire descriptive indices of participants' perceptions of their experiences. Similarly, item analyses are not evaluated in this Report.

The Television Lesson. The fifteen instructional programs televised through the facilities of WENH-TV, Durham, New Hampshire, were assessed by nine items of the Survey. The "maximum score" for this section was thirty-six. The data presented in Table X note both the average score for the nine-item section as well as the mean value of each response in this section according to the scheme presented above. The perceived value of each component of the fifteen-week instructional program may be assessed by an examination of the rank-order of individual television presentations.

The data clearly indicate the television presentations were well received - mean value of 2.94 for the entire program - and, in general, individual lessons were rated as favorable to the needs of the participants. It might be noted, however, that a pattern of "priority" has begun to develop (and becomes more pronounced in the remaining three sections of the program) in that the lessons pertaining to Art Appreciation, Evaluation, and the Role of the Teacher were less valued than the "action-types" of lessons. It is also of some significance that the most favorable lessons are dispersed throughout the program and not concentrated within a relatively discrete time span of the program.

TABLE X -- Rank-Order of Statistics of the Television Lessons

Week	Lesson Title	Rank	Average Score	Mean Value	N*
01	Drawing	1.5	28.11	3.12	332
07	Puppetry	1.5	28.10	3.12	321
04	Paper Construction	3.0	27.60	3.07	304
02	Painting	4.0	27.35	3.04	312
09	Printing	5.0	26.94	2.99	315
10	Weaving and Stitching	6.0	26.84	2.98	314
11	Group Activities	7.0	26.58	2.95	290
05	Papier Mache	8.0	26.35	2.93	303
12	Modeling and Sculpture	9.0	26.29	2.92	275
03	Motivation	10.5	25.95	2.88	310
14	Scrap Materials	10.5	25.89	2.88	308
15	Display and Summary	12.0	25.87	2.87	220
13	Art Appreciation	13.0	25.09	2.79	277
08	Evaluation	14.0	24.82	2.76	316
06	Role of the Teacher	15.0	24.62	2.74	307
	Total Television Lessons		26.42	2.94	300

N* varies according to participant attendance at evaluation, Ns identical for all Tables in this section.

The Study Guide. A rather extensive curriculum of study guide was developed for concomittant use with the televised instructional segment of the workshop. In general, the Study Guide made available to the participants such information as (a) the purpose of the associated television lessons, (b) suggested bibliographical references for each of the fifteen lessons (c) an extensive materials list for use both in the workshop and the enrollee's classroom, and (d) suggestions for organizing and planning the work session associated with the televised lessons and their potential applications to the individual's classroom.

The value of the Study Guide was assessed by seven items of the Course Evaluation Survey. Results of these evaluations - with a maximum quantitative score of twenty-eight - appear in Table XI.

TABLE XI -- Rank-Order and Statistics of the Study Guide

Week	Lesson Title	Rank	Average Score	Mean Value
01	Drawing	1.0	21.82	3.12
07	Puppetry	3.0	21.41	3.06
04	Paper Construction	3.0	21.40	3.06
02	Painting	3.0	21.39	3.06
09	Printing	5.0	20.89	2.98
10	Weaving & Stitching	6.5	20.72	2.96
05	Papier Mache	6.5	20.71	2.96
11	Group Activities	8.0	20.60	2.94
12	Modeling & Sculpture	9.0	20.49	2.93
03	Motivation	11.0	20.44	2.92
13	Art Appreciation	11.0	20.43	2.92
14	Scrap Materials	11.0	20.41	2.92
08	Evaluation	13.5	19.31	2.76
06	Role of the Teacher	13.5	19.29	2.76
15	Display & Summary	15.0	15.62	2.23
	Total Study Guide		20.32	2.90

The rank-ordered lessons note distinctive "breaks" in perceived value at several points, namely, the lesson on Drawing was perceived to be extremely favorably, followed by an extensive cluster of favorable viewed lessons, and two of the three lowest ranked lessons are again those noted as "acceptable" in the presentation of the television lesson segment of the instructional program.

The Work Session. The work session was designed to provide each workshop participant with an opportunity to implement the knowledge acquired through the television lesson and the supplementary information presented in the Study Guide. This section was evaluated by nine items of the Course Evaluation Survey and allowed for a maximum response score of thirty-six. Results of the fifteen lesson evaluations are presented in Table XII. It should be remembered that, unlike the television lesson and Study Guide sections, the work sessions required "active" participation by the enrollees under the guidance of the instructional staff. Thus, the work session evaluation was an assessment of the extent to which the enrollees were capable of implementing the more formal presentation of the program.

Several major shifts in rank-order position are noted in Table XII in comparison with the preceding tables. Of special significance are the rank order positions for the Weaving and Stitching and the Scrap Materials lessons which were ranked much higher for the work session than for either the television lesson or the Study Guide sections of the program.

TABLE XII -- Rank-Order and Statistics on the Work Session

Week	Lesson Title	Rank	Average Score	Mean Value
04	Paper Construction	1.0	27.44	3.05
01	Drawing	2.0	27.25	3.03
10	Weaving & Stitching	3.5	26.36	2.93
09	Printing	3.5	26.33	2.93
07	Puppetry	5.5	26.26	2.92
02	Painting	5.5	26.24	2.92
14	Scrap Materials	7.0	25.85	2.87
05	Papier Mache	8.0	25.28	2.81
03	Motivation	9.0	24.91	2.77
11	Group Activities	10.0	24.81	2.76
12	Modeling & Sculpture	11.0	24.71	2.75
13	Art Appreciation	12.0	24.15	2.68
08	Evaluation	13.0	23.02	2.56
06	Role of the Teacher	14.0	22.88	2.54
15	Display & Summary	15.0	11.25	1.25
	Total Work Session		24.44	2.71

It should be noted that the lessons concerned with Weaving and Scrap Materials were tangible or work-oriented rather than lecture or reading lessons. Such an observation appears to support the multi-dimensional design of the workshop in an effort to provide a broadly-based instructional program. That is, some concepts obviously lend themselves to verbal or visual presentation, others are more applicable through tangible techniques of instruction. The multi-technique approach may well be a requisite for a total instructional program in an area such as art where use of multiple senses is of critical importance.

The Classroom Follow-Up. The classroom follow-up was designed to permit and evaluate the effectiveness of the transfer of knowledge accrued from the formal instructional program to the enrollee's classroom. Although it is assumed that a valid evaluation of program effectiveness should be examined through the employment of a post-course follow-up study, a preliminary assessment was acquired through responses to four items of the Course Evaluation Survey. The responses to these items appear in Table XIII and permit a maximum response score of sixteen.

An examination of participant responses indicates a generally favorable evaluation of the classroom follow-up activity. Again, the lessons on Evaluation, Role of the Teacher, and Display and Summary were clearly perceived as less effective than the more definitive content areas of the program.

Of interest, however, is that the mean value for the total program was slightly higher for the classroom follow-up (2.75) than for the work session activities (2.71), and both sections were assessed at a much lower level of effectiveness than for either the television lesson (2.94) or the Study Guide (2.90). One plausible explanation for this occurrence is that the pace of the course - fifteen lessons in fifteen weeks - does not allow sufficient time for the participant to implement the knowledge gained through the more formal sections of the program. It might be fair to assume that workshop participants must react much in the manner of a "sponge" during the fifteen-week duration of the course, and that a valid assessment of the applicability of the workshop must be gained through an extensive on-site follow-up study in the participant's classroom.

TABLE XIII -- Rank-Order and Statistics on the Classroom Follow-Up

Week	Lesson Title	Rank	Average Score	Mean Value
01	Drawing	1.0	12.10	3.02
04	Paper Construction	2.0	11.85	2.96
02	Painting	3.0	11.79	2.95
07	Puppetry	4.0	11.78	2.94
09	Printing	5.0	11.73	2.93
14	Scrap Materials	7.0	11.57	2.89
10	Weaving & Stitching	7.0	11.56	2.89
12	Modeling & Sculpture	7.0	11.55	2.89
11	Group Activities	9.0	11.51	2.88
03	Motivation	10.0	11.33	2.83
13	Art Appreciation	11.0	11.29	2.82
05	Papier Mache	12.0	10.99	2.75
08	Evaluation	13.0	10.47	2.62
06	Role of the Teacher	14.0	10.21	2.55
15	Display & Summary	15.0	5.61	1.40
	Total Classroom Follow-Up		11.02	2.75

Summary. The preceding sub-sections presented the results of participant responses to each of the four sections of the Course Evaluation Survey. A more comprehensive evaluation of the total program was accomplished by cumulating the response scores over the four sections. The results of this evaluation are presented in Table XIV. It should be noted that each of the four sections was assessed on a cumulative basis and no attempt was made to differentially weight the separate components.

A somewhat different assessment of the total program was accomplished by computing an "average ranking" of the fifteen lessons over the four program section rankings. That is, a matrix of rank-by-section was developed for each of the fifteen lessons and an average rank computed for the four sections of the program. Results of this computation appear in Table XV.

TABLE XIV -- Rank-Order and Statistics on Total Course Evaluation*

Week	Lesson Title	Rank	Average Score	Mean Value
01	Drawing	1.0	89.27	3.08
04	Paper Construction	2.0	88.29	3.04
07	Puppetry	3.0	87.55	3.02
02	Painting	4.0	86.77	2.99
09	Printing	5.0	85.89	2.96
10	Weaving & Stitching	6.0	85.43	2.95
14	Scrap Materials	7.0	83.72	2.89
11	Group Activities	8.0	83.50	2.88
05	Papier Mache´	9.0	83.33	2.87
12	Modeling & Sculpture	10.0	83.03	2.86
03	Motivation	11.0	82.62	2.85
13	Art Appreciation	12.0	80.96	2.79
08	Evaluation	13.0	77.61	2.68
06	Role of the Teacher	14.0	77.00	2.66
15	Display & Summary	15.0	58.36	2.01
	Total Course Evaluation		82.22	2.83

*Based on Cumulative Average Scores over four segments of the Course Evaluation Survey.

A comparison of the two sets of data - Tables XIV and XV - reveal only a very minor reordering effect for three lessons. The affected order of Scrap Materials, Group Activities, and Papier Mache for Table XIV data was altered to the order of Group Activities, Papier Mache, and Scrap Materials in Table XV. However, the relative positions of these three lessons may be noted in Table XV as being essentially equivalent.

TABLE XV -- Average Rank of Lessons
Over Four Program Segment Rankings

Week	Lesson Title	Average Ranking
01	Drawing	1.3
04	Paper Construction	2.2
07	Puppetry	3.5
02	Painting	3.8
09	Printing	4.6
10	Weaving & Stitching	5.7
11	Group Activities	8.5
05	Papier Mache'	8.6
14	Scrap Materials	8.8
12	Modeling & Sculpture	9.0
03	Motivation	10.1
13	Art Appreciation	11.7
08	Evaluation	13.3
06	Role of the Teacher	14.1
15	Display & Summary	14.2

Additional insight concerning the impact of individual lessons may be gained from an examination of the sectional format of Table XV. If it can be intuitively assumed that a differential rank order position of 1.5 ranks indicates a meaningful perceptual difference between individual lessons or groups of lessons, then the data indicate several distinct groups of response.

The first and most favorably received group (mean value = 3.0) consisted of those lessons which were definitely 'tangible' - Drawing, Paper Construction, Puppetry, Painting, Printing, and Weaving and Stitching. This grouping appears to be consistent with stated objectives for participating in the workshop (cf. Enrollee Objectives, Section I, of this Report) in that participants acquired knowledge of techniques and materials of use in the development of creative art in their classrooms. Also of interest is that the most favorably perceived lessons were those typically taught within a department of art (rather than department of education) and were materials rather than educational methodology oriented.

The second cluster of program areas included Group Activities, Papier Mache, Scrap Materials, Modeling and Sculpture, and Motivation. It seems reasonable to assume that the three tangible lessons in this group are also those which are most difficult to implement within the typical school system. Few rural school systems would be in an economic position to permit investment in materials necessary to pursue the development of an art program of which modeling and sculpture represent a major segment of the program. Papier Mache and Scrap Materials are relatively accessible and are usually found in most existing programs. The remaining two lessons - Group Activities and Motivation - are non-tangible objectives which are typically discussed within a formal department of education program (e. g., educational psychology, etc.), and were perceived as being somewhat less pertinent to the workshop objectives of the participants.

The lesson concerned with Art Appreciation "stood alone" in the average rankings but perhaps could logically be grouped within the preceeding section. It was perceived as being somewhat distinct from the remainder of the instructional program.

The final lesson grouping, consisting of Evaluation, Role of the Teacher, and Display and Summary, were not well received. Much of this rejection was probably due to the characteristics of the enrollees as noted in Section I of the Report. In short, the participants were searching for materials and techniques in art, but were not receptive to being told how to evaluate their students or in having their role defined by an external source. The generally poor response to the Display and Summary lesson (excluding the Television Lesson section) was due in great measure to the position of the lesson in the total program. The Display segment of this lesson, easily communicated through the medium of television, was well received, but the summary segment was generally rejected as a post facto phonomenon.

C. INDIVIDUAL GAIN OVER TIME

In order to assess participant gain in knowledge about the content of the program, two instruments were designed for pre- and post-test administrations to workshop participants, and the gain score treated as the basic measure to be studied. The Art Review Test, developed by the Instructional staff of the workshop, included a sample of items generated from the study guide and the instructional programs. This forty-item instrument was validated on a sample of participants who had completed a similar Title III Art Workshop in 1966-67 and who had subsequently contributed extensively to the development of the 1967-68 edition of the Study Guide. (A copy of the Test is included in Appendix C.)

The Art Review Test was administered to 215 participants at the initial class session of the 1967-68 workshop. It should be noted that the remaining 117 enrollees did not complete the administration due to the staggered enrollment procedures at individual centers. Items from the pre-test were randomly reassigned in the development of Form B of the Art Review Test which was administered to the 215 participants as the post-test instrument at the final meeting of the workshop.

A standard t-test was employed to assess the statistical significance of individual gain scores. The statistic $t_{\bar{d}}$ has Student's distribution with (N-1) degrees of freedom, and a one-tailed test applied (alpha = .05). Results of the test appear as Table XVI.

TABLE XVI -- Statistical Test for Gain
Art Review Test

Test	X	s	$\bar{D}$	$t_{\bar{d}}$	p*
Pre-Course	25.77	5.00	+3.27	+7.94	>.005
Post-Course	29.11	6.43			

*$t_{\bar{d}}$.005 > +2.58, df=214, one-tail.

This analysis indicates a highly significant gain from pre-course to post-course on the Art Review Test. Although it cannot be assumed that the participants will transfer this knowledge to their individual classrooms, the primary objective of the program - communicating knowledge concerning materials and techniques in elementary art - was most favorably accomplished.

As it appeared plausible that one could assume that the statistical significance of the gain scores on the Art Review Test might be due to rote , the Maitland-Graves Design Judgment Test, which proports to measure aptitude for appreciation and production of art structure, was employed as a secondary assessment instrument.

The Graves was administered on a pre- and post- test basis to 271 workshop participants under conditions noted for the Review Test. Again the 't' statistic was applied on a one-tail test with (N - 1) degrees of freedom with (alpha = .05) as the criterion. The results of this analysis are presented in Table XVII.

TABLE XVII -- Statistical Test for Gain -
Maitland-Graves-Design Judgment Test

Test	$\bar{X}$		$\bar{D}$	$t_{\bar{d}}$	p*
Pre-Course	59.22	14.09	+3.20	+5.05	>.005
Post-Course	62.54	14.85			

*$t_{\bar{d}}$.005 > +2.58, df=270, one-tail.

The statistical significance of the above test supports the findings yielded by the test applied against the Art Review Test. Together they rather clearly indicate that workshop participants enjoyed considerable gain in their efforts to acquire factual knowledge and techniques related to the teaching of elementary art.

II. PHASE II -- SCIENCE

A. CHARACTERISTICS OF THE ENROLLEE

The Teacher Inventory, a basic biographical questionnaire similar to that employed in the Art Phase, was developed to assess the demographic, social and professional characteristics of the Title III Science participants. This questionnaire was designed as a two-part form: (a) Part I- focusing on the acquisition of general information and data concerning each enrollee, and (b) Part II - a special section (not included in the Art Phase) concerned with current programs, publications and professional organizations, and the enrollee's self-concept of his goals and abilities as an elementary science teacher.

Enrollments By Center. Unlike the enrollment data for the Art Program -- where enrollments varied widely by center and, in some cases, registration procedures and participant-instructor ratios were ill-advised - the sixteen Science centers averaged 19.8 participants (in comparison to the 25.5 mean enrollment in the Art Program) and were evenly distributed across centers with but one exception (Cf. Table XVIII).

TABLE XVIII -- Enrollments by Center*

Center Code	Center	Enrollment	% Total	Center Code	Center	Enrollment	% Total
712	Claremont	16	5.0	734	Portsmouth	23	7.2
714	Concord	16	5.0	740	Salem	21	6.6
717	Exeter	19	6.0	741	Derry	22	6.9
726	Littleton	19	6.0	742	Somersworth	23	7.2
727	Manchester -1	16	5.0	743	Laconia	23	7.2
728	Milford	18	5.7	744	Hampton	20	6.3
729	Nashua	29	9.2	749	Lebanon	20	6.3
733	Peterborough	16	5.0	767	Manchester-2	16	5.0
					TOTALS	317,	$\bar{x}$= 19.8

*Total enrollment figure represents participants for whom valid Teacher Inventory data were available.

The very obvious difference between enrollment data for the Science and Art Programs (Cf. Table I for Art) may be attributed to several plausible factors: (a) the science centers were selected on a more representative regional basis with the inclusion of Laconia and Littleton - north of Concord and serving to a much greater extent the "North Country" and the central region of New Hampshire - the Milford and Peterborough centers serving the region between Manchester and Keene, and the excellent selection of six science centers (as opposed to four art centers) to serve the populous Seacoast Region, (b) a more conscious effort by Program administrators to control the enrollment procedures at each center thus preventing overload at all but one center, (c) the very nature of the Science program itself having a self-limiting effect on enrollment in that its subject matter focused more heavily on the cognitive domain whereas the art was more affectively oriented, and (d) an apparent awareness of and involvement with program registration and logistical matters by both the Program staff and the University Extension Service. If any of these plausible explanations are indeed valid, the evaluation staff applauds the program administrators for consciously examining the very critical but (we hoped) constructive observations made by the Bureau in its Phase I Interim Report.

Age. Age data on the Science Program participants reveal a rather unique distribution across a thirty-six year age range as noted in Table XIX. Unlike the Art participants, the distribution remains essentially constant across a wide age range and indicates a rather different professional commitment in science than was found for the art participants. This observation receives further support from data on teaching experience presented in the following section.

TABLE XIX -- Age

Age Range	N	% Total
21-27	79	24.9
28-37	74	23.3
38-47	60	18.9
48-57	79	24.9
58-67	25	7.9

The mean age for science teachers was 39.5 years in comparison with the 42.4 mean computed for the art enrollees. Of primary interest, however, is the number of young teachers in elementary science as opposed to the older art teachers (Cf, Table III - Art). Several plausible explanations occur at this point: (a) as noted earlier, the subject matter of science is more cognitive than the more aesthetic or affective subject matter of art, and one finds the younger teachers more interested in and concerned with science and technology, (b) the cognitive nature of science requires greater concern with detail and appeals to the younger generation whereas, in general, interest and aptitude for art and art education appears to increase with age and maturity, (c) the nature of science requires the teacher to maintain greater contact with recent professional and technological developments in the area of science - often requiring the science teacher to become a summer school student as a tertiary requirement of his job-whereas the area of art education is apparently more stable and advances in art instruction develop more slowly and require less dependence on refresher courses.

Teaching Experience. The earlier observation on the youthful nature of the science teacher is clearly noted in data relative to the number of years of teaching experience and should be compared with those data on the are teacher (Cf. Table IV) to permit a very interesting visual comparison. Although we had noted that the science teacher was younger than his art colleague (i. e., science = 39.5 *versus* art = 42.4), the data on teaching experience emphasize a significant difference between these two groups.

TABLE XX -- Number of Years
Teaching Experience

Years Teaching	N	% Total	Years Teaching	N	% Total
No Response	4	1.3	5-10	64	20.2
Beginning	59	18.6	11-15	30	9.5
One	43	13.6	16-20	21	6.6
Two	17	5.4	21-25	17	5.4
Three	22	6.9	26-30	7	2.2
Four	16	5.0	31-35	7	2.2
(Subtotal 0-4)	(157)	(49.5)	(Subtotal 5-35)	(146)	(46.0)

49.5% of the science teachers indicated they were either beginning teachers or had taught less than five years. The art teachers or had taught less than five years. The art teachers noted only 29.4% for the comparable teaching experience group. But of primary significance is the number of science teachers who were either beginning teachers or had completed only one year in the elementary classroom - 32.2% - compared with only 13.8% for the comparable art teacher group. Then, even if one extends the experience range through ten years, the science teachers in this range represent 69.2% as opposed too 35.1% in art -- a 2:1 ratio!

Although it would be possible to speculate on these differences over the ten-year experience range, the most apparent differences occur in the Beginning and One Year groups. It seems reasonable to assume that the extreme difference in experience between science and art teachers may be due principally to (a) the number of men entering the science education field and (b) its very plausible relationship to the impact of the Vietnam conflict. Since this report is not designed as an evaluation of political science but rather science education no extensive effort is made to dwell on the suggested correlation, but it is a reality in current teacher preparation that many young men are entering the teaching profession rather than graduate school or the military, and we would hypothesize that if one took the time to collect pertinent data on this matter the hypothesis would be accepted. One further observation on this theory: If, indeed, the nature of political developments is forcing the young to pursue - however temporary - a career in the teaching profession as a means of acquiring a draft-exempt status, then one seriously questions (a) if such a forced-decision will be of long-range benefit to education and especially elementary science education, or (b) if such a decision will ultimately have an adverse effect on the quality of science teachers presently entering our elementary classrooms. Again, we are not concerned with political science and world affairs, per se, but our hypothesis should receive some conscious examination.

Role and Grade Level. The major target-groups for the science project were the classroom teachers at the Primary and Intermediate levels. The data in Tables XXI and XXII clearly indicate the target-group objective was successfully attained.

TABLE XXI -- Present Role in School System

Major Role	N	% Total
No Response	4	1.3
Substitute	16	5.0
Teacher	285	89.9
Supervisor	4	1.3
Other	8	2.5

The importance of providing supplementary instruction in science education for the classroom teacher is further supported by the data of Table XXIV which notes that few science consultants are available in most elementary schools in New Hampshire. The Role data indicate that only four supervisors (1.3%) were involved in the present effort and eight teachers taught special classes not directly focusing on science education in the elementary school.

TABLE XXII -- Major Grade Level Assignment

Grade Level	N	% Total
No Response	3	1.0
Primary	161	50.8
Intermediate	111	35.0
Junior High	24	7.6
Special Groups	8	2.5

Perhaps of greatest significance, however, is the number of enrollees whose major grade level assignment was in the primary grades thus indicating the filtering of science education downward from the secondary level to the lower grades. The 50.8% enrollment by teachers in primary grades was most encouraging. It generally appears that elementary teachers are most ill-prepared and lack self-confidence in understanding and communicating recent developments in science. Again, however, the desperate need for science consultants in and to the schools of New Hampshire is underscored by these data.

Professional/Academic Achievement. The deprived status of elementary science education in New Hampshire is perhaps best and most tragically illustrated by enrollee data on professional and academic preparation. Table XXIII data suggest that over sixty per cent of the elementary science teachers in the region's schools either do not possess an academic degree (20.8%) or hold an academic degree in a non-science area! Yet, the economy and the teacher supply-demand ratio of New Hampshire (and most rural states) simply fail to adequately support the preparation and employment of qualified elementary science teachers, and the non-science college graduate and the non-graduate apparently have little difficulty in obtaining employment as science teachers!

TABLE XXIII -- Professional/Academic Achievement

Degree Now Held	N	% Total
No Degree	66	20.8
Normal School	14	4.4
B. A. science area	38	12.0
B. S. science area	17	5.4
B. A./B. S. in Ed.	30	9.5
B. A. non science	134	42.3
M. A./M. S.	12	3.8
C. A. G. S.	0	0.0
Other	6	1.9

Again, we might reflect on the Age and Teaching Experience data previously cited. These data, together with the above professional/academic preparation data, certainly reflect very negatively on the status of science education in the State (and, perhaps nationally) and, indeed, present a very pessimistic picture unless adequate economic support and extensive program modifications can be implimented in the implimented in the immediate future. Then, one might further speculate on the impact of these data on the pupil in the elementary classroom.

Elementary Science Program Resources. Additional and similarly bleak information on New Hampshire's elementary science programs are noted in Table XXIV. As was true in the art curriculum (Cf. p. 6 of this Report) the elementary teacher in the New Hampshire classroom has little at his disposal for science resources and the lack of science consultants is but one example of the need for major revision in the region's perceptions and expectations of elementary science programs (Cf. Table XXXI for supplementary economic support data). At this point it seems most reasonable to suggest that the instructional television program supported under this Grant may have provided a much-needed service to the classroom teacher, and it appears that this program was one of only a very few sources of support for the science teacher in New Hampshire!

TABLE XXIV -- Structure of School Science Program/Resources

Inquiry Statement	N Yes	N No	% Yes	% No
A. Does your school have a science guide for the grade you teach?	114	170	40.1	59.9
B. Is your school served by a science consultant, coordinator, or supervisor?	19	289	6.2	93.8
C. Do your pupils have a science text for your course (s)?	215	102	67.8	32.2

Finally, it is one factor not to have a science consultant available for the classroom teacher, but it is a very tragic situation when 32% of the elementary science teachers in the region do not even have an elementary science text available for use in their instructional programs, and a science guide is available in only 40% of the schools!

Contact with Professional Programs, Publications, and Organizations. Part II of the Teacher Inventory was designed to yield pertinent information on the typical elementary science program in New Hampshire schools. One of the more critical questions asked of each enrollee by the Program staff was the extent of the teacher's contact with recent developments in elementary science and his association with the professional literature and organizations characteristic of his profession. The responses of program participants are summarized in Table XXV.

A further illustration of extremely limited professional preparation - if contact with professional organizations and knowledge of recent developments in elementary science education can be assumed as a valid criterion of preparation and practice - is noted as follows: (a) 85% of program enrollees had not used,, or seen used, any specialized science units and 89% had not had contact with the four principal programs in the area of elementary science education, (b) 89% of the science teachers did not subscribe to a single professional newsletter in their instructional area and 95% did not receive any of the four principal newsletters, (c) although 58% were members of the NHEA, only 7.2% hold membership in NHSTA and less than 2% hold memberships in the two major science education professional organizations of national significance, and (d) only 3% of the participants subscribed to national professional publications concerned with elementary science, and less than half of the teachers subscribe to any professional publication or journal.

Thus, we have over sixty per cent of our elementary science teachers without a professional degree in a science area, less than one-half in contact with professional literature or organizations of which only 11% are specifically oriented to science in the elementary school! Again, we can only infer from these data that the typical primary and intermediate level student in the New Hampshire area may at best be receiving mediocre science instruction from a poorly trained teacher.

TABLE XXV -- Contact with Professional Programs, Publications, and Organizations (Pre-Course Only)*

Inquiry Statement	Professional Contact Category	% Yes	% No
Have you ever used, or seen used, any of the science units developed by the following groups?	AAAS	2.8	96.2
	ESS	10.3	88.8
	SCIS	3.1	95.9
	ASCAP	6.2	92.5
	Other	13.7	85.0
Do you presently receive the newsletters published by any of the following groups?	AAAS	2.2	96.9
	ESS	3.7	95.3
	SCIS	1.6	97.5
	ASCAP	2.8	95.6
	Other	10.2	88.8
Are you presently a member of any of the following organizations?	NHSTA	7.2	91.9
	ESS	1.9	94.1
	NHEA	58.2	40.8
	ASCAP	1.2	97.5
	Other Professional	52.0	45.8
Do you personally subscribe to any of the following publications?	Science and Children	2.2	95.0
	The Science Teacher	3.4	93.8
	The Instructor	30.2	68.5
	Other Professional	46.1	53.3

*N = 321 valid data sheets, percentages may not total 100% due to omitted or error responses.

Status of Subject Matter Areas in the Elementary School. It is of some interest that, despite the very poor economic and professional support provided for the development and maintenance of elementary science education, the participants rated science fourth highest in a list of twelve subject areas in terms of its importance to the total curriculum of the elementary school. The most important area was perceived by the teachers to be mathematics, and was closely followed by reading and language arts. The data are presented in Table XXVI for both pre-course and post-course ratings by program participants.

Although no statistical tests were performed on pre-course versus post-course participant responses to the data in Tables XXVI through XXX, an asterisk has been noted for those items in which a major pre-post difference is observable. In Table XXVI, for example, the subject area ratings for language arts, social studies, physical education, and other curricula decreased from pre-to-post and only science was viewed more favorably at post-test. Of some interest, however, is the decrease in teachers' perceptions of essential to the curriculum with a higher percentage now being viewed at post-test as more desirable rather than essential.

TABLE XXVI -- Participant Ratings of Subject Areas Value at Grade Level*

Subject Area	Pre-Course Rating % Essential	 % Desirable	 % Neither	Post-Course Rating % Essential	 % Desirable	 % Neither	Obsv. Diff.
mathematics	97.2	2.5	0.3	93.1	6.9	0.0	
penmanship	62.3	31.8	5.9	56.5	37.6	5.9	
science	79.7	19.9	0.3	82.1	17.9	0.0	
language arts	95.0	4.7	0.3	82.1	17.9	0.0	*
art	38.3	60.1	1.6	32.8	63.4	3.8	
social studies	77.9	21.5	0.6	67.2	31.7	1.0	*
foreign languages	9.0	60.1	1.6	6.2	59.6	34.1	
physical education	55.1	43.0	1.9	44.8	54.1	0.7	*
reading	95.0	2.8	2.2	87.2	9.6	2.8	
music	40.2	58.9	0.9	31.7	66.5	1.7	
drama	10.6	72.0	17.4	8.6	74.5	16.9	
other areas	17.8	41.4	32.7	7.6	52.8	33.8	*

*Pre-Course N=321, Post-Course N=290, for data in Tables XXVI - XXX, no statistical test performed for pre post differences.

Procedures and Materials Ratings. Participants were asked to rate the value of several activities as a means of meeting the goals of an elementary science program. Several of the suggested activities were concerned with instructional procedures, while others related to instructional materials and group activities common to the elementary science curriculum. The pre- and post-course data on enrollee responses to the seventeen items are presented in Table XXVII with notable pre- post differences noted by asterisks.

Seven of the seventeen items dealt with what one might label recitation-type activities (e.g. written answers to textbook questions, oral reports on assigned topics, etc.). Of these items, six of the items reported a marked decrease in their perceived value to the instructional goals, while the seventh item - homework written answers to textbook questions - was viewed as being of little value at both pre-course and post-course administration.

Three items dealt with the value of instructional materials. The use of science films or loops was perceived as being of substantial value both prior to the course and at completion of the course, although a slight decrease in perceived value was recorded from pre to post. The employment of commercial scale models, generally expensive and, therefore, of economic significance, was judged to be of moderate value at pre-course but its value decreased significantly at the conclusion of the program. Finally, science films were perceived to be of substantial value, but this perception dropped considerably at course-end.

The use of simple materials for science activities was assessed by two items. Activities carried out by pupils in class with these materials was rated as the most valuable strategy at both pre and post-course (pre = 98% substantial value, post = 93% substantial value). Of particular significance was the participants' rating of the value of activities carried out at home using simple materials 48% substantial at pre-course rising to 71% substantial value at completion of the course.

The remaining five items tapped a wide range of activities ranging from subscriptions to science literature to the implimentation of science fairs in the elementary school. Class subscriptions to science newspapers and magazines were viewed with increased significance to the elementary science program with 35% viewing these materials as essential at pre-course and 47% perceiving substantial value at post-course. Science field trips were also perceived to be of greater importance at the conclusion of the program, rising from 74% to 91% substantial value. Class discussions were generally viewed to be of substantial value (86+%) at both pre and post-course evaluations. The use of guest speakers and science fairs were generally perceived to be of moderate value and were not affected by the Title III program.

TABLE XXVII -- Participant Ratings of Procedures for Meeting Program Goals

Type-Method Procedural Activities	Pre Course Rating %Sub-stantial	% Moderate	% Little	Post-Course Rating %Sub-stantial	% Moderate	% Little	Obsv. Diff.
class written answers to textbook questions	21.5	53.6	24.9	8.3	49.3	42.4	*
class oral answers to textbook questions	53.3	40.5	6.2	20.7	63.1	15.9	*
class reading assignments in a textbook	43.3	39.6	17.1	16.9	54.8	28.3	
home written answers to textbook questions	11.5	45.8	41.7	4.5	35.5	60.0	
home reading assignments in a textoook	21.8	46.4	30.8	9.0	48.3	42.8	*
written reports on assigned topics	48.6	40.2	10.9	29.6	49.0	21.4	*
oral reports on assigned topics	64.2	31.5	4.0	46.0	44.8	8.3	*
science film strips or film loops	75.7	23.7	0.3	70.0	29.3	0.7	
commercial scale models	28.7	60.4	10.6	16.2	65.2	18.6	*
class subscriptions to elementary science newspapers or magazines	34.6	51.7	13.1	47.2	46.9	5.9	
activities carried out by pupils in class using simple materials	97.5	2.5	0.0	93.4	6.2	0.3	
activities carried out by pupils at home using simple materials	47.7	46.6	5.6	71.0	18.6	0.3	*
science films	82.5	16.8	0.3	73.4	26.2	0.3	*
science fairs	40.5	49.5	9.7	50.3	39.6	10.0	
field trips	73.5	25.8	0.6	91.4	8.3	0.3	*
guest speakers	53.3	40.8	5.9	53.4	44.5	2.1	
class discussions	88.2	10.0	0.9	86.5	10.7	2.8	

The substantially increased value of field trips and pupil activities at home using simple materials, coupled with far less reliance upon recitation-type activities were among the principal objectives which the Title III program hoped to communicate. The above data clearly indicate that the Program staff was particularly successful in meeting these objectives.

Educational Goals of the Science Program. Title III participants were asked how they would rate each of three goals typically and traditionally viewed by professional publications as being of importance in the development of an elementary science program. Again, participant reactions were tabulated for both pre-course and post-course administrations of this opinion scale.

TABLE XXVIII -- Participant Goals in Science Programs

Goal	Pre-Course			Post-Course			Obsv. Diff.
	% Primary	% Secondary	%Incidental	% Primary	% Secondary	%Incidental	
preparing children for a career in some field of science	4.7	29.0	65.4	2.1	24.5	72.4	
preparing children for life in a science oriented society	69.5	20.6	9.7	81.0	11.4	7.6	*
preparing children for the study of science at the next grade level	32.7	46.4	20.9	14.1	62.1	23.8	*

The data in Table XXVIII note a very definitive shift in participants' views concerning the principal objectives of their science program. Although few teachers felt that their goal should be to prepare future scientists, the post-course evaluation suggested that such a goal should become even more incidental than is commonly held by some professionals. Also, the science teachers at post-course evaluation felt less inclined to view the preparation of their pupils for the next grade level to be of primary importance than they had originally felt to be true. Finally, the principal goal of the elementary science program should be, in the opinion of program participants preparing children for life in a science-oriented society. The teachers felt more strongly of this goal-orientation at completion of the program.

Reflecting again on earlier findings of this study, it appears to be crucial that teacher preparation institutions and, indeed, teacher certification agencies examine and drastically revise their requirements in order to provide our schools and elementary pupils with qualified and committed instructional personnel together with associated administrative and economic support. It is one concept that we must prepare children for life in a science-oriented society , and quite another to provide the leadership and logistical support permitting classroom teachers (and students) to attain this goal.

Pupil Requirements for Meeting Program Goals.
Participant teachers were presented several statements concerning pupil requirements necessary in meeting the goals of their science programs and were asked to rate the value of these characteristics on a three-point scale. Some of these statements were content or cognitive-oriented, while others were designed to assess the perceived value of more humanistic characteristics of the elementary curriculum.

TABLE XXIX -- Factors of Value to Children in Meeting Goals of the School Science Program

Factor	Pre-Course Value			Post-Course Value			Obsv. Diff.
	%Sub-stantial-	% Moderate-	% Little	% Sub-stantial-	% Moderate-	% Little	
problem solving skills and abilities	69.2	23.4	7.2	71.0	23.1	5.9	
knowledge of science laws, facts, and principles	35.2	49.2	15.3	7.2	55.9	36.9	*
familiarity with the things that make up their environment	94.4	5.6	0.0	91.0	4.9	4.1	
self-reliance, self-confidence, and self-respect	81.6	16.5	1.9	88.6	10.7	0.3	
respect for the rights and opinions of others	87.9	11.5	0.6	93.8	6.2	0.0	
an active curiosity	96.6	3.1	0.3	93.1	4.1	2.4	

In an opinion parallel to the perceived primary goal of preparing children for life in a science-oriented society (Cf. Table XXVIII, p.27), the teachers felt that the child's curiosity should be developed to familiarize him with the things that make up the pupil's environment. On the other pole, however, the participants felt that the more humanistic values of developing in a child his respect for others, his self-reliance and self-confidence was viewed almost equally important in meeting the goals of the elementary science program. Although problem-solving skills and abilities were also perceived as of importance, the Title III participants responded that knowledge of science facts, laws, and principles were of moderate to little value to the achievement of a successful program. On the basis of pre-and post-course comparisons only the knowledge of laws, etc. factor was appreciably altered with a pre-course value of 35% substantial dropping to a 7% substantial value to program goals.

It is plausible to assume that as science becomes more and more accepted as an integral segment of the elementary curriculum its emphasis on scientific facts and laws - a connon and perceived important factor in secondary education science programs - will become less and less important as suggested by the above data. It might be interesting to speculate on the future possibility of a "traditional" versus " modern mathematics" transition (or philosophical conflict) becoming reincarnated into a "facts" versus "humanistic experience" confrontation in elementary science education.

Participant Concept of Teaching Elementary Science.

Science teachers enrolled in the Title III Program were asked to respond to a series of questions concerning their perceptions on the teaching of science in the elementary school. Several items focused on the teacher's self-perception of his ability to teach elementary science, while other items were concerned with the teacher's concept of modern science and its importance to the pupil. Participant reactions to these items are presented in Table XXX for both pre-course and post-course evaluations. All opinions were expressed on a four-point scale of Strongly Agree to Strongly Disagree.

Three statements required the teacher to react to his perceived ability to teach elementary science. An examination of Table XXX data reveals that the participants felt more self-confident of their role and performance as a science teacher upon completion of the Title III program. Pre-course data, for example, indicated that only 17% of the teachers had seldom experienced any real difficulty in teaching science, while this response group represented 29% of the population at completion of the course. Of some note is that while 59% of the participants indicated lack of time as their principal difficulty in teaching elementary science prior to the Title III program, the percentage dropped to 33% at post-course evaluation. Finally, while 62% indicated a definite lack of subject-matter background at pre-course evaluation, only 36% felt limited by their science background at completion of the course. These data clearly indicate the Title III program to have had significant positive impact on the participants' self-perception of their ability to develop and maintain a meaningful elementary science program.

TABLE XXX -- Participant Reaction to Statements Concerning Teaching Science

Statement	Pre-Course				Post-Course				Obsv. Diff.
	% SA	% AS	% DS	% SD	% SA	% AS	% DS	% SD	
I seldom have any real difficulty in teaching science.	16.8	26.5	37.1	19.4	29.0	33.4	30.0	7.2	*
My major difficulty in teaching science is lack of time.	19.7	40.8	23.0	16.5	14.5	19.3	31.0	35.2	*
Science should be taught only to pupils with above-average ability.	3.7	0.9	7.5	87.2	7.6	0.3	4.1	87.9	
My major difficulty in teaching science is lack of subject-matter background	28.0	33.6	16.2	21.2	10.3	26.2	26.2	36.9	*
If a person doesn't care about science, he should not have to study it.	3.7	4.7	16.8	73.5	3.8	8.6	22.4	65.2	
The information provided in the textbook is enough for me to teach my pupils.	3.7	18.4	26.8	49.2	6.6	5.2	13.1	75.2	
Science is so complicated that you really can't teach it to elementary school pupils.	1.9	0.0	6.5	90.6	2.1	1.4	7.2	89.3	
Modern science is so complicated that most teachers can't really understand it.	2.8	13.4	22.4	57.9	5.2	11.4	19.0	62.4	
They're trying to get elementary teachers to teach more and more junior high school science in the lower grades.	12.1	32.1	26.2	26.5	4.8	19.3	27.2	48.3	*
The average elementary teacher can teach science as well as she can teach any other subject in the elementary curriculum.	13.4	19.6	39.2	26.8	44.1	26.9	21.0	7.9	*

A further series of items focused on the value of teaching science in the elementary school grades. Over 87% of the participants rejected the concept that science should be taught only to pupils with above-average ability, and 90% strongly disagreed with the notion that science is so complicated that (you) really can't teach it to elementary school pupils. No significant change in teacher opinions were noted for these two items from pre-course to post-course evaluations. Finally, 74% of the participants strongly disagreed at pre-course evaluation with the statement that a pupil should not have to study science if he doesn't care about science, while response to this suggestion decreased slightly to 65% strong disagreement at post-course evaluation.

Three opinion-type items were aimed at assessing the expectations of the teacher of elementary science. At both pre- and post-course evaluations over 58% of the participants strongly disagreed with the statement that modern science is so complicated that most teachers can't really understand it, and no significant observable difference was noted as a result of the program. Two additional items however, yielded observable differences between pre-course opinions and reactions at completion of the Title III program. Where prior to the program only 13.4% of the participants strongly agreed that the average elementary teacher was capable of teaching science as well as any other subject in the elementary curriculum, over 44% of these same teachers responded that they strongly agreed that the average teacher was capable of this effort at the completion of the program: Finally, the common complaint that the teaching of science was being forced upon the elementary teacher - to which 44% of program enrollees agreed prior to the program-was severly criticized at post-course evaluation when 76% of the program participants disagreed with this observation.

Finally, 49.2% of the participants strongly disagreed with the statement the information provided in the textbook is enough for me to teach (my) pupils at the time they enrolled in the Title III program; over 75% of the science teachers at post-course evaluation felt the textbook was insufficient.

In summary, we may assume that the Title III project and its instructional staff certainly had impact on the participants' concepts of the role and function of the elementary science teacher and program. Most notable in this regard was the apparent shift in enrollee self-concept as teachers as from a very pessimistic concept of ability and conviction to a most favorable and positive concept of their role in the development of an elementary science program in their schools.

Characteristics of Participants' School Facilities, and Self-Rating as Science Teachers. A series of eight items seeking descriptive information on participants' schools, facilities and their self-rating as teachers was presented in the Teacher Inventory as a segment of the pre-course evaluation. The first three items focused on the degree of financial and material support available to each teacher in his particular elementary school. Two additional items were designed to assess his perceived satisfaction in teaching science as well as the feelings of his pupils. The final segment of this series asked participants to rate their ability in and understanding of the more technical aspects and recent program developments in elementary science. These data are summarized in Table XXXI.

TABLE XXXI -- Characteristics of Participants School Facilities, and Self-Rating as Science Teacher (Pre-Course Only)

Inquiry Statement	Response Alternative	% Responding
Rate the abundance of materials available for use in your science classes?	sufficient	24.6
	limited	37.1
	insufficient	37.1
How much money is available during the school year for your use in obtaining supplies for your science classes?	$ 1-25	33.0
	$26-50	5.9
	$51-75	4.0
	$76-100	4.4
	More than $100	4.4
	None available	49.2
What is the principal source of money available for your use in obtaining supplies for your science classes?	school district funds	38.0
	parent organizations	5.0
	the teacher of science	15.6
	student organizations	0.3
	other sources	6.5
	None	34.6
Do you enjoy teaching science?	almost always	61.7
	occasionally	33.6
	seldom	2.2
	almost never	1.6
Do most of your pupils enjoy science?	almost always	73.3
	occasionally	21.8
	seldom	1.2
	almost never	0.9
How do you rate your science background in terms of technical knowledge?	excellent	4.0
	good	19.1
	fair	46.7
	poor	29.9
How do you rate your ability to teach elementary school science?	excellent	3.4
	good	32.4
	fair	51.5
	poor	12.6
How do you rate your understanding of the more recent approaches toward the teaching of elementary school science?	excellent	3.1
	good	26.8
	fair	43.0
	poor	27.1

The findings concerning school facilities and economic support for elementary science programs maximally illustrate what has often been labeled the poverty-level support of education in the State and region. Surely, New Hampshire must share the dubious honor of being among the few states which contribute less than $20 per year in supplies and materials support of elementary science programs in the average classroom. And, ironically, over one-fourth of this amount was apparently contributed by the elementary science teacher from his own professional salary!

Only 25% of the enrollees responded that sufficient materials were available for use in their elementary science programs, while 37.1% noted access to limited funds and an equal percentage stated that funds were insufficient for providing adequate support for their science programs.

Despite this clear lack of support for facilities and finance, over 95% of the science teachers responded that they enjoyed teaching elementary science and 61.7% almost always enjoyed their teaching role. Similarly, the teachers expressed the belief that 73.8% of their pupils almost always enjoyed science, 21.8% occasionally enjoyed the subject, and only 2.1% of the pupils seldom or almost never enjoyed science.

Prior to completion of the Title III program most teachers rated their technical knowledge of science as fair (46.7%)and a similar view was expressed for their perceived ability and understanding of elementary school science programs. All of these data were tabulated for pre-course evaluation only and do not reflect changes which may have occured as a result of the Title III program. Earlier findings, however, (Cf. Participant Concept of Teaching Elementary Science, pp. 29-31 of this report) rather clearly suggest that the Title III program resulted in a greatly improved self-concept and self-confidence in their role and ability as elementary science teachers.

Participant Reactions to Statements from the Study Guide. Several statements were adopted from the Study Guide to assess the participant's position on selected instructional concepts and issues covered by the Television Lessons and the instructional guide itself. Each inquiry statement was phrased in a definitive mode and the enrollee was required to respond by employing a four-point scale of Unqualified Agreement, Qualified Agreement, Qualified Disagreement, or Unqualified Disagreement.

As these position statements were presented to participants on a post-course evaluation only and no comparison is possible with their untapped pre-course opinions, the data are presented in Table XXXII without further discussion. It might be noted, however, that many items parallel conceptual materials presented and analyzed in earlier sections of this Report.

TABLE XXXII -- Participant Reactions to Statements from the Study Guide (Post-Course Only)

Study Guide Statement	% UA	% QA	% QD	% UD
The relatively small amount of factual scientific information that a child may assimilate in the elementary grades will have little relevance to the problems he will face as an adult.	17.9	20.3	31.7	28.6
There are fundamental skills and universal understandings that can be applied to the successful resolution of any problem.	43.8	44.1	7.9	3.4
Traditional elementary science programs will not help children to prepare to deal with the great problems that the environment presents.	23.8	31.7	29.6	14.1
Children instinctively know that in order for them to deal effectively with their environment they must first understand it.	25.2	36.2	26.2	11.7
The things which arouse a child's curiosity are legitimate topics for serious investigation.	51.7	40.7	4.8	2.1
Allowing each pupil to pursue his own particular interest is not an appropriate way of guiding children into science activities	10.7	25.2	42.8	20.7
The first step in planning science activities is to decide what skills and understanding will probably be of most value to children whenever they attempt to satisfy their curiosity.	39.0	46.2	12.1	2.1
Teachers of science in the elementary grades should not impose their own interpretation of the significance of natural phenomena upon the children they teach.	48.6	34.1	12.4	4.1

(TABLE XXXII Continued on Following Page)

TABLE XXXII -(Continued)

Study Guide Statement	% UA	% QA	% QD	% UD
Children should be encouraged to invent their own measuring systems before being exposed to the standardized systems commonly used by adults.	54.1	39.3	3.8	2.1
An experiment proves nothing. All an experiment can do is produce information.	32.8	30.7	19.3	16.6
It is better not to use any text at all in a science program if the only alternative is a single text.	25.2	32.8	33.8	7.6
Written reference material should not be used before the third grade in an elementary science program.	16.6	30.0	35.5	16.6
A child's science experiences should not be restricted entirely to direct experiences with materials from his environment.	21.7	52.4	16.2	9.0
Audio-visual materials can be valuable supplements to a child's direct experiences in science.	57.6	37.6	2.1	1.7
Models are as helpful to children engaged in scientific inquiry as they are to working scientists.	32.8	43.4	16.6	4.5
There is little value in requiring a child to memorize a few of the classification systems used by scientists.	38.6	33.1	15.9	10.3
The classification systems a child invents need not resemble those used by scientists or other adults.	54.5	34.1	4.1	5.2

(TABLE XXXII Continued)

Field trips in the science program should not be guided tours.	46.2	37.9	9.6	4.5
A science field trip should arouse questions at least as often as it answers them.	63.1	30.0	4.1	1.0
Teachers cannot accurately measure the effectiveness of their science programs until they know exactly what they want their programs to accomplish.	54.1	30.0	6.6	2.8

B. LESSON EVALUATIONS

The recurrent concern with evaluating each segment of the televised programs and their associated instructional manuals and materials led to the development of a standard Course Evaluation Survey for the fifteen concent areas of the instructional sequence. The survey document developed for the Title III Science program was identical to that employed for the Art phase of this project with the exception of the Lesson Titles (Cf. Appendix I). Each lesson was again presented in four sections -- The Television Lesson, The Study Guide, The Work Session, and The Classroom Follow-Up. Participant opinions to the evaluative items were assessed by a four-point response scale identical with that employed in the evaluation of the Art Program.

The response-objective scale utilized in this evaluation is reproduced below:

Response Scale	Value	Objective Scale
Strongly Agree	4	Very Favorable
Agree	3	Favorable
Disagree	2	Unfavorable
Strongly Disagree	1	Very Unfavorable

Results of the fifteen lesson evaluations are presented for each of the four sections of the instructional program. No effort has been made to assess the statistical significance of these data since our primary interest was to acquire descriptive indices of participants' perceptions of program experiences. Similarly, item analysis data, included in Appendix J, are not evaluated in this Report.

Some comparison is made between participant reactions to and evaluation of the instructional segments of the Title III Art and Science phases. Although we cannot assume that the television programs and instructional procedures employed for Art are identical with those utilized for Science, a very gross comparison (i. e., mean ratings over all fifteen programs) might be of some assistance to project personnel is viewing the comparative receptiveness of these two projects. It should be emphasized, however, that such a comparison should be made with caution, and results of the programs' evaluations are only indicative of total reception.

The Television Lesson. The fifteen instructional programs televised through the facilities of WENH-TV, Durham, New Hampshire, were assessed by nine items permitting a maximum score of thirty-six. The data presented in Table XXXIII note both the average score for the series as well as the mean value of response to each program. The fifteen lessons are rank-ordered according to average score data to facilitate examination of their relative position of affect. (Note: The above procedure is applied to data in Tables XXXIII through XXXVI.)

TABLE XXXIII -- Rank-Order of Statistics of the Television Lesson

Week	Lesson Title	Rank	Average Score	Mean Value	N*
09	Models and Audio-Visual Aids	1.0	28.30	3.14	263
04	Observation - A Science Skill	2.0	28.21	3.13	243
11	Collecting and Classifying	3.0	27.76	3.08	273
01	Elementary Science Today	4.0	27.51	3.06	316
13	The Field Trip	6.0	27.04	3.00	255
12	The Outdoor Laboratory	6.0	27.02	3.00	265
02	Activity-Centered Science	6.0	27.00	3.00	276
10	Classroom Plants and Animals	8.0	26.74	2.97	253
03	Planning Science Activities	9.0	26.48	2.94	295
06	Conducting Experiments	10.0	26.41	2.93	243
15	Evaluating Your Science Program	11.0	26.15	2.91	189
05	Measurement - Another Skill	12.0	25.59	2.84	282
07	Supplementing Direct Experiences	13.0	25.20	2.80	254
14	New Programs in Elem. Science	14.0	25.12	2.79	257
08	Evaluating Pupil Progress	15.0	22.86	2.54	261
	Mean Total -- Television Lessons.		26.49	2.94	262

*N varies according to participant attendance at evaluation, Ns identical for all Tables in this section.

Participant reactions to the Television Lessons clearly indicate the presentations were well received and, in general, individual lessons were rated as favorable with seven of the fifteen lessons receiving a 3.00 or above rating. The mean rating of the fifteen lessons was 2.94 which, coincidentally, was identical to the television rating for the Art Phase of the Title III Project. The mean value distribution for the science lessons was somewhat different than that noted for Art - 12 of 15 art lessons were so rated. This comparative finding would indicate a rather skewed distribution for the science program - with more lessons perceived as favorable - and a more normal distribution for the art phase. The2.54 mean value rating assigned to the eighth science lesson - Evaluating Pupil Progress -certainly separated this lesson from the remaining fourteen television presentations in respect to its instructional value to program participants. Finally, the two most highly-ranked lessons -- Models and Audio-Visual Aids, and Observation - A Science Skill-- are subjects most adaptable to the television medium and were considered by far to be the most valuable presentations.

The Study Guide. An extensive and well-documented series of curriculum - instructional materials was developed for the various segments of the fifteen instructional programs in association with the television lessons. In general, the format of the Science Study Guide paralled the Guide developed specifically for the Art Phase of the Title III Project (Cf. p. 10 for format specifications).

The instructional value of the Guide was assessed by seven items of the Course Evaluation Survey and a maximum quantitative score of twenty-eight was applied. Participant reactions to the Study Guide is suggested in Table XXXIV.

TABLE XXXIV -- Rank-Order of Statistics of the Study Guide

Week	Lesson Title	Rank	Average Score	Mean Value
01	Elementary Science Today	1.0	23.06	3.29
09	Models and Audio-Visual Aids	2.0	22.18	3.17
02	Activity-Centered Science	3.0	21.87	3.12
11	Collecting and Classifying	4.5	21.78	3.11
04	Observation - A Science Skill	4.5	21.74	3.11
13	The Field Trip	6.0	21.35	3.05
12	The Outdoor Laboratory	7.0	21.10	3.01
10	Classroom Plants and Animals	8.0	20.99	3.00
06	Conducting Experiments	9.0	20.72	2.96
05	Measurement - Another Skill	10.0	20.54	2.93
07	Supplementing Direct Experience	11.0	20.09	2.87
03	Planning Science Activities	12.5	20.04	2.86
14	New Programs in Elem. Science	12.5	20.03	2.86
15	Evaluating Your Science Program	14.0	19.82	2.83
08	Evaluating Pupil Progress	15.0	19.34	2.76
	Mean Total -- Study Guide		20.98	3.00

The Study Guide for the Title III Science Project was extremely well received as indicated by the 3.00 mean value rating by the participants. Earlier sections of this Report noted a genuine lack of professional preparation, limited materials and resources, and a generally negative self-image of ability in teaching elementary science. The favorable rating attributed to the Study Guide is perhaps a clear indication that the Guide provided enrollees with much-needed tangible resources for use in their science programs. Of some importance in this regard is the positional ratings of the individual program lessons -- information concerning recent developments in science (01), elementary science materials and methodologies (09, 02, 11, 04, etc) being rated high, while such subjects as planning and evaluating elementary science programs was ranked low by comparison.

A comparison of the Art ratings with the Science ratings reveals that while thirteen of the fifteen Art lessons were rated above the mean value for the entire program, only one-half of the Science lessons were rated above the mean.

It should be pointed out, however, that only four Art lessons were rated above 3.00 in comparison to double that number for the Science programs.

The Work Session. The work session was designed to provide each participant with an opportunity to experience implimentation of several concepts and procedures presented in the televised and instructional guide segments of the project. Appropriate instructional and experimental materials were made available to the enrollees for actual work sessions under the supervision of the project staff.

This segment was evaluated by nine items of the Course Evaluation instrument and allowed for a maximum score of thirty-six. Results of the evaluation are presented in Table XXXV.

TABLE XXXV -- Rank-Order of Statistics on the Work Session

Week	Lesson Title	Rank	Average Score	Mean Value
01	Elementary Science Today	1.0	29.74	3.30
02	Activity Centered Science	2.0	27.88	3.10
09	Models and Audio-Visual Aids	3.0	27.63	3.07
04	Observation - A Science Skill	4.0	27.20	3.02
11	Collecting and Classifying	5.0	27.11	3.01
13	The Field Trip	6.0	26.24	2.92
05	Measurement - Another Skill	7.0	26.17	2.91
12	The Outdoor Laboratory	8.5	26.14	2.90
10	Classroom Plants and Animals	8.5	26.08	2.90
07	Supplementing Direct Experiences	10.0	25.83	2.87
03	Planning Science Activities	11.0	25.55	2.84
06	Conducting Experiments	12.0	25.29	2.81
14	New Programs in Elem. Science	13.0	24.57	2.73
15	Evaluating Your Science Program	14.0	23.30	2.59
08	Evaluating Pupil Progress	15.0	22.41	2.49
	Mean Total -- Work Session		26.03	2.90

Initially observable is the comparative mean values of the science and art phases of the Title III Project (science= 2.90 art= 2.71) which indeed reflect a differential reception to this segment of the project. It seems plausible to assume that the subject matter of the science phase was (a) more applicable to a work session environment than was possible with the art, and (b) science teachers by nature are more concerned with and sensitive to a laboratory session. A full eleven of the fifteen program lessons are of a laboratory nature.

The lessons receiving the two lowest ratings were both primarily concerned with the evaluation of the elementary program and pupil progress, and agree with the rather negative report for similar lessons of the art program. Participants were not concerned with or interested in evaluative information regardless of program content.

The Classroom Follow-Up. The classroom follow-up was designed to permit the participants to evaluate the effectiveness of program knowledge when transferred to their elementary science classrooms. The responses to this four-item evaluation are tabulated below and yield a maximum response score of sixteen.

TABLE XXXVI -- Rank-Order of Statistics on the Classroom Follow-Up

Week	Lesson Title	Rank	Averagw Score	Mean Value
01	Elementary Science Today	1.0	12.22	3.05
02	Activity-Centered Science	2.0	12.02	3.00
09	Models and Audio-Visual Aids	3.0	11.59	2.90
13	The Field Trip	4.0	11.55	2.89
04	Observation - Science Skill	5.0	11.27	2.82
11	Collecting and Classifying	6.0	11.19	2.80
07	Supplementing Direct Experiences	7.0	11.09	2.77
06	Conducting Experiments	8.5	11.01	2.75
10	Classroom Plants and Animals	8.5	11.00	2.75
12	The Outdoor Laboratory	10.0	10.97	2.74
05	Measurement - Another Skill	11.0	10.79	2.70
03	Planning Science Activities	12.0	10.78	2.69
14	New Programs in Elem. Science	13.0	10.25	2.56
08	Evaluating Pupil Progress	14.0	9.49	2.37
15	Evaluating Your Science Program	15.0	8.76	2.19
	Mean Total -- Classroom Follow-Up		10.93	2.73

It is particularly significant that the mean value of the Classroom Follow-Up (2.73) was significantly lower than the mean values of the three previously discussed segments (2.94, 3.00, 2.90). Two explanations for this difference seem plausible: (a) as in the art program, sufficient time may not have been allowed for the participants to implement the knowledge and procedures developed during the fifteen-week instructional phase of the science program, and (b) the nature of elementary science programs, focusing heavily on classroom activities (e. g. planting seeds) may not allow many implimented programs to reach a point at which the effects of the instructional program may be accurately evaluated or its impact internalized and communicated by the pupils to the classroom teacher.

The two evaluation programs again were viewed as comparatively unfavorable as was true for the Study Guide and Work Session segments of the program evaluation. As suggested earlier this negative reaction to the evaluative function of the teacher is a common phenomenon among teachers at all grade levels.

Summary of Lesson Evaluations. The four preceding subsections presented the results of participant responses to each segment of the instructional program. A more comprehensive evaluation of the total science program was accomplished by cumulating the response scores over the four segments for presentation in Table XXXVII. It should be noted that no attempt was made to differentially weight the instructional segments, and the maximum total evaluation score was 116 for the entire twenty-nine item Course Evaluation.

TABLE XXXVII -- Rank-Order of Statistics on Total Course Evaluation

Week	Lesson Title	Rank	Average Score	Mean Value
01	Elementary Science Today	1.0	92.53	3.19
09	Models and Audio-Visual Aids	2.0	89.70	3.09
02	Activity-Centered Science	3.0	88.76	3.06
04	Observation - A Science Skill	4.0	88.42	3.05
11	Collecting and Classifying	5.0	87.84	3.03
13	The Field Trip	6.0	86.18	2.97
12	The Outdoor Laboratory	7.0	85.23	2.94
10	Classroom Plants and Animals	8.0	84.80	2.92
06	Conducting Experiments	9.0	83.44	2.88
05	Measurement - Another Skill	10.0	83.09	2.87
03	Planning Science Activities	11.0	82.85	2.86
07	Supplementing Direct Experiences	12.0	82.22	2.84
14	New Programs in Elem. Science	13.0	79.96	2.76
15	Evaluating Your Science Program	14.0	78.03	2.69
08	Evaluating Pupil Progress	15.0	74.11	2.56
	Mean Total -- Course Evaluation:		84.48	2.91

The above data clearly indicate favorable participant response to twelve of the fifteen instructional programs of the elementary science project. The three remaining programs were generally perceived of neutral to somewhat favorable value to the enrollees. Again, the two evaluation-type lessons and the New Programs lesson were somewhat different in content from the majority of the instructional program as suggested earlier in the discussion.

Viewed on a comparative total course basis the science phase of the Title III project was perceived more favorably than the art instructional phase of the project (mean value total science of 2.91 versus 2.83 for art). The evaluative lessons were assigned a low rating for both art and science phases of the project.

A somewhat different assessment of the total science program was accomplished by computing an average ranking of the fifteen lessons over the four program segment rankings. The matrix of rank-by-segment over the fifteen lessons and instructional segments resulted in the lesson rankings presented in Table XXXVIII.

TABLE XXXVIII -- Average Rank of Lessons Over Four Program Segment Rankings

Week	Lesson Title	Average Ranking
01	Elementary Science Today	1.3
09	Models and Audio-Visual Aids	2.2
02	Activity-Centered Science	3.2
04	Observation - A Science Skill	3.9
11	Collecting and Classifying	4.4
13	The Field Trip	5.5
12	The Outdoor Laboratory	7.9
10	Classroom Plants and Animals	8.2
06	Conducting Experiments	9.9
05	Measurement - Another Skill	10.0
07	Supplementing Direct Experiences	10.2
03	Planning Science Activities	11.1
14	New Programs in Elem. Science	13.1
15	Evaluating Your Science Program	13.5
08	Evaluating Pupil Progress	14.8

A comparison of the data in Tables XXXVII and XXXVIII reveals only one order-shift over the entire fifteen lesson format where the relative positions of the seventh and third lessons- Supplementing Direct Experiences and Planning Science Activities - were reversed.

The results of applying the alternative strategy of average ranking does, however, establish several rather definitive groupings of instructional lessons. It was intuitively assumed that a differential average ranking of 1.5 points would be indicative of a meaningful perceptual difference between individual lessons or groups of lessons (note: identical criterion applied for art data - Cf. Table XV).

One might view the Table XXXVIII groupings in several manners. First although the ranked value of the instructional programs was generally evenly distributed according to a criterion of 'week presented', there does seem to appear two distinct clusters of subject-matter distinguishable by week of presentation. The most highly ranked cluster of this type includes the Weeks 10-13 grouping, and a similar observation may be noted for

Weeks 3-7 with the single exception of Lesson 04- Observation, A Science Skill - which was perceived to be of much greater value. Finally, a two-week cluster of Lessons 14-15 rated negatively. These clusters suggest the plausible effect of instructional differences according to the project staff assigned to these individual weeks of presentation.

Examination of these data from the standpoint of subject-matter rather than the earlier criterion of week-of-presentation suggests a somewhat different participant response to the instructional program. The most highly-ranked cluster outlined in Table XXXVIII include instructional objectives that were activity-oriented, in general, and laboratory-oriented, specifically, with limited exception. The program requirements, as detailed in the Study Guide, suggest the participants were called upon to do or impliment the subject matter of this cluster rather than to listen to the material presented in the instructional segments of the science project (i.e. activity versus lecture).

The second cluster - The Outdoor Laboratory and Classroom Plants and Animals- might be related to laboratory-type experiences but required more extensive time to impliment (e.g. planting seeds, etc.), than was true with the first cluster of lessons, and were perceived of somewhat different immediate value or reward by the participants.

The third cluster included planning-type experiences and were more informative or procedural in nature than the activity-centered lessons. Finally, the fourth cluster included what most teachers would label as lessons secondary to the core of the instructional program. As was true for the art phase of the Title III project, teachers of elementary science had little interest in evaluating their science programs or in the evaluation of pupil progress. These subject areas apparently were viewed as unrelated to the real content of the elementary science program insofar as the Title III instructional project was concerned.

III. SUMMARY

A. Phase I - Art

It seems plausible to assume that the enrollees' interests and objectives for participation in the workshop were to up-date themselves in the areas of ideas, materials and techniques related to the teaching of art in the elementary school. The workshop program especially provided enrollees with information relevant in the tangible areas of contemporary art, and fulfilled the primary objective of the program.

The Title III program also provided teachers with an opportunity to pursue advanced study in elementary art without the negative effect of the geographic and personal contingencies noted in Section A of the Report. The expansion of the television network, coupled with the development of trained instructional staffs at selected regional centers, should greatly enhance the improvement of art instruction in the communities of New Hampshire.

Finally, although it was clearly demonstrated that the program had significant impact on its participants, the implications of these experiences for the student in the elementary classroom can only be assessed through the design and development of an extensive follow-up study. It is suggested the feasibility of such a program be given serious examination and that future Title III programs of this nature might include provisions for a longitudinal follow-up study with both workshop graduates and their students.

B. Phase II - Science

Two rather distinct areas of concern are presented as a result of examining information and data from the science phase of the Title III Project. The first pertains to that section of the Report relative to the characteristics of the participating science teacher population and their professional environment, while the second set of reactions focuses more specifically on the impact of the Title III Project as an instructional vehicle.

Our primary concern rests with the apparent lack of professional/academic preparation criteria for teachers of elementary science in the schools of New Hampshire and the northern New England region. While we had assumed a general lack of professional credentials, the sparseness of facilities available to impliment elementary science programs, and the general lack of economic and professional consultation support available to elementary teachers, the results of the present evaluation study were almost unreal in this age of scientific inquiry. It is ironic that elementary science teachers, whose principal goal is to prepare pupils to live in and understand a science-oriented society and world, must attempt to achieve their instructional goal without adequate affective and tangible support from their communities and the State.

There is little excuse, in our opinion, for the elementary pupils of the region to be subjected to inferior educational programs in our schools. We also question any justification of the fact that over sixty percent of the elementary science teachers of the region either do not hold any professional credentials or, at best, have satisfied only the State's minimal requirements for employment in our schools. We cannot condone the almost total lack of economic support for programs in elementary science, or the essentially 100% lack of professional resources, or the very high percentage of pupils who do not have a single science text available for study in the classroom. It is generally argued that the economic characteristics of the region cannot support educational programs in such areas as elementary science, but the evaluation team suggests most emphatically that it is not so much a matter of limited resources as it is a case of political expediency and public irresponsibility.

The second set of reactions - evaluation of the impact of the Title III science program - are most favorable and encouraging. Above all, the instructional segments of the program provided regional elementary science teachers with excellent tangible resources and materials for study and implimentation at the classroom level. The Study Guide offered teachers some concrete suggestions for the development of a meaningful science program and helped to fill the notable void created by the general lack of support for materials and instructional resources. The Television Lesson segment and the Work Session permitted elementary science teachers with an opportunity to view and experience recent developments, instructional procedures and materials. As suggested earlier the impact of the Classroom Follow-Up segment of the project cannot be properly evaluated at this time due to an insufficient time-lapse between the instructional segments and the transfer of knowledge to the participant's classroom. We might assume, however, that a longitudinal evaluation effort of the implimentation segment might be of probable significance and should be undertaken by the project staff during the 1968-69 academic year.

APPENDIX A

Teacher Inventory

CENTER ____________________

WENH - Title III

ART WORKSHOP
Questionnaire

PLEASE PRINT

1. Name ____

2. Address (Home) ____
street

____
town or city state zip code

3. School Address ____
street

____
town or city state zip code

4. School Position:

_____ Teacher

_____ Principal

_____ Supervisor

_____ Substitute

5. If a teacher, indicate grade level: __________

6. Age:

_____ 20-25
_____ 26-30
_____ 31-35
_____ 36-40
_____ 41-45
_____ 46-50
_____ 51-55
_____ 56-60
_____ 61-65
_____ 66-70

7. Number of years of teaching experience. Give TOTAL as of September 1, 1967

_____ Beginning
_____ One Year
_____ Two Years
_____ 3-4 Years
_____ 5-6 Years
_____ 7-8 Years
_____ 9-10 Years
_____ 11-15 Years
_____ 16-20 Years
_____ 21-25 Years
_____ 26-30 Years
_____ 31-35 Years
_____ 36-40 Years
_____ 41 Years and over

8. Degree you now hold:

______ A.B. ______ A.M.

______ B.S. in Ed. ______ Ed.M.

______ Other ______ Other

9. Degree for which you are now working, if any:

______ Masters

______ Advanced Certificate

______ Doctor's Degree

10. Did you have any Art Courses as an undergraduate:

_____YES _____NO

11. How Many: _____

12. If you can recall the titles, please list:

____

____

____

____

13. Have you had any Art Courses in Graduate School:

_____YES _____NO

14. How many: _____

15. If you can recall the titles, please list:

____

____

____

____

PLEASE CHECK FIVE REASONS WHY YOU ENROLLED IN THIS ART COURSE

1.______To learn more about how to "sketch" for use in my classroom.

2.______To learn more about what standards to apply to children's art.

3.______To learn more about how to direct the use of finger paints.

4.______To learn more about how to make mobiles.

5_______To learn more about how to draw people.

6.______To learn more about how to model clay.

7.______To learn more about how to teach the children about clay.

8.______To become more familiar with the great artists.

9.______To learn more about how to draw faces.

10._____To learn more about how to direct the use of chalk.

11._____To learn more about how to direct the use of water color.

12._____To learn more about how to direct the use of crayons.

13._____To learn more about blending colors.

14._____To get ideas for developing a "creative art" program as part of the regular classroom activity.

15._____To learn more about design and be able to apply this learning in my classroom.

16._____To become more sensitive to design, form and line.

17._____To learn more about composition of materials on a bulletin board.

18._____To learn more about what to expect of children in art work at certain age levels.

19._____To get some "feel" for being able to work in "art".

20._____To learn more about how to make things from papier mache.

21._____To learn more about how to make and use puppets.

22._____To learn more about working with children in "creative art".

23._____To learn more about how to teach perspective.

24._____To learn more about architectural styles and forms.

25._____To learn more about "directed" art lessons.

26._____To learn more about how to make a collage.

27._____To learn how to use media and materials to stimulate artistic expression.

28._____To learn more about how to do stenciling.

29._____To learn more about linoleum block work.

30._____Other reasons - please indicate:

____

____

____

____

____

APPENDIX B

Course Evaluation Survey

COURSE EVALUATION SURVEY

Art 692 -- Art for Elementary Teachers

EVALUATION DATE	LESSON CODE	CONTENT TITLE
Oct. 16	Lesson 001	Drawing
Oct. 16	Lesson 002	Painting
Oct. 16	Lesson 003	Motivation
Oct. 23	Lesson 004	Paper Construction
Oct. 30	Lesson 005	Papier Mache´
Nov. 6	Lesson 006	Role of the Teacher
Nov. 13	Lesson 007	Puppetry
Nov. 16	Lesson 008	Evaluation
Dec. 4	Lesson 009	Printing
Dec. 11	Lesson 010	Weaving and Stitching
Dec. 14	Lesson 011	Group Activities
Jan. 15	Lesson 012	Modeling & Sculpture
Jan. 22	Lesson 013	Art Appreciation
Jan. 29	Lesson 014	Scrap Materials
Feb. 1	Lesson 015	Display & Summary

QUESTIONNAIRE

A. The Television Lesson (Section I on Answer Sheet)

1. The subject-matter content was too advanced for the grade I teach.
2. The subject-matter content was too elementary for the grade I teach.
3. The TV lesson suggested ideas for activities I will conduct with my pupils.
4. The TV lesson suggested teaching techniques that I will try in my classroom.
5. The lesson was a meaningful introduction to the work-session that followed.
6. Filmed classroom segments adequately related concepts of the lesson to my classroom.
7. Studio segments with children were realistic and applicable to my pupils.
8. Studio demonstrations allowed me to better understand the main ideas of the lesson.
9. This television lesson should be repeated in another year.

B. The Study Guide (Section II on Answer Sheet)

41. The study guide provided a meaningful introduction to the TV lesson.
42. The discussion questions were pertinent to the general topic of the lesson.
43. Directions for the work-session were sufficiently clear and comprehnesive.
44. The suggested materials list was sufficiently specific and understandable.
45. I plan to use at least one of the bibliographical references noted in the Guide.
46. The study guide allowed me to plan follow-up activities for my own class.
47. The study guide for this lesson needs no major revision.

C. The Work Session (Section III on Answer Sheet)

81. The purpose of the work-session was clear and comprehensive.
82. The work-seesion was well organized and interesting.
83. I had no difficulty providing suggested materials for this work-session.
84. The materials for this work-session were difficult to work with.
85. Sufficient time was allowed to complete the work-session activity.
86. The work-session activity needs no major revision for use with my pupils.
87. The work-session helped me plan follow-up activities for my own classroom.
88. Too much time was allowed for completion of the work-session activity.
89. This work-session activity should be repeated in another year.

D. The Classroom Follow-up (Section IV on Answer Sheet)

121. The suggested follow-up activity for this lesson was appropriate and valuable.
122. Sufficient time was allowed for follow-up activity.
123. Too much time was allowed for follow-up activity.
124. Follow-up activity needs major revision before being repeated in another year.

Thank You

APPENDIX C

Art Review Test

WENH-TV

ART IN TEACHING

Review Test

General Directions

You will have 30 minutes in which to take this test. When you are told to begin, turn the page, read the directions at the top of the page, and start immediately to work on the test.

Do not spend too much time on any one question. If a question seems to be too difficult, make the most careful guess you can rather than waste time over it. Your score will be the number of correct answers you mark.

Give only one answer to each question. Questions for which you mark two or more answers will not be counted. If you make a mistake or wish to change an answer, be sure to erase your first answer completely.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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Directions: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one which is best in each case and then blacken the corresponding space on the answer sheet.

1. Which of the following aspects of a child's art experience most stimulates and contributes to his emotional growth?

   (1) Developing an awareness of past and present cultures
   (2) Satisfying the requirement for disciplined study
   (3) Providing for a constructive release of feelings
   (4) Providing opportunities for visual activity

2. One of the most important recent trends in the teaching of art in the elementary school has been the shift of emphasis from

   (1) two-dimensional media to three-dimensional media
   (2) the use of patterns to individual creative work
   (3) drawing to crafts
   (4) making realistic painting to making abstract paintings

3. The best justification for including drawing in the elementary art program is that

   (1) drawing is the most natural way for the child to express his ideas
   (2) drawings can often give teachers valuable insights into their pupil's thinking
   (3) a drawing can be done in a relatively short period of time
   (4) drawings do not require expensive materials

4. In addition to wax crayons, crayon engraving requires which of the following materials?

   (1) string and ink
   (2) tempera and wire
   (3) nail and paper
   (4) paste and scrap

5. A compound of starch and tempera is a suitable substitute for

   (1) watercolor
   (2) finger paint
   (3) underglaze
   (4) printing ink

6. Sponge painting is a good technique for achieving

   (1) fine details of line
   (2) textures of varying rough qualities
   (3) delicate blending tones
   (4) dramatic contrast of light and shade

7. When painters speak of value, it is most likely that they are referring to the

   (1) lightness or darkness of a color
   (2) sales price of a painting
   (3) brightness or intensity of a color
   (4) formal balance of a composition

8. If a child presists in repeating the style and subject matter of his earlier art work, it is most likely that he

   (1) does not enjoy changing media
   (2) has had too many printing experiences
   (3) lacks the ability to change media
   (4) has not been effectively motivated to broaden his art experiences.

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9. The techniques and designs of paper construction can be adapted to all of the following EXCEPT

(1) weaving
(2) mosaics
(3) ceramics
(4) mobiles

10. In which of the following are all the words names of paper?

(1) Pierce, relief, manila
(2) Newsprint, crepe, tab
(3) Manila, bogus, newsprint
(4) Bogus, score, plane

11. To decrease the difficulty of folding heavy paper or cardboard, a child should be advised to do which of the following first?

(1) Measure
(2) Pleat
(3) Score
(4) Slit

12. What is the "form" over which papier-mache is often used called?

(1) A matrix
(2) Am armature
(3) A prime form
(4) A retainer

13. The most inexpensive adhesive to use with papier-mache is

(1) Elmer's Glue
(2) classroom paste
(3) wallpaper paste
(4) rubber cement

14. The greatest value a child derives from work in papier-mache is that it provides him with experiences in

(1) using materials that are inexpensive and easily obtained
(2) three-dimensional manipulation
(3) creatively using the odds and ends of leftover materials
(4) intensive group activity

15. Which of the following best supports the belief that the classroom teacher is a better person to teach art in her own classroom than a special art teacher?

(1) She has more time to work with her pupils.
(2) She can obtain equipment more easily.
(3) She is able to motivate her pupils more effectively.
(4) She knows her pupils better.

16. What is the fastest and easiest way to distribute many materials to a large class?

(1) Pass them out yourself.
(2) Have one of the students pass them out.
(3) Have each student get his own materials.
(4) Have several student assistants pass them out.

17. A relief print is made by rolling ink

(1) through a stretched fabric
(2) into engraved lines
(3) onto a raised surface
(4) over a greased block

18. All of the following are reversal prints EXCEPT

(1) linoleum block prints
(2) monoprints
(3) clay prints
(4) silk-screen prints

19. Puppetry is a valid classroom activity chiefly because it provides

(1) scope for children to work in an expressive group and to use a variety of techniques
(2) opportunities for children to learn the rudiments of acceptable speech
(3) an exciting assembly project at the end of the term
(4) Occasions for children to enjoy themselves spontaneously

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20. From the standpoint of manipulation, the most complex type of puppet is the:

(1) finger puppet
(2) stick puppet
(3) shadow puppet
(4) marionette

21. Which of the following is NOT an objective for providing children with experiences in weaving and stitchery?

(1) to develop their ability to make selective judgements about color, texture, and design
(2) to develop their appreciation for the craftsmanship of past generations
(3) to teach them to be resourceful in finding and and selecting materials
(4) to teach them that textiles serve primarily aesthetic rather than functional needs of man

22. What is the name of the vertical threads through which cross weaving is done?

(1) shuttle
(2) jute
(3) weft
(4) warp

23. Simple basic weaving is called d

(1) tabby
(2) tapestry
(3) herringbone
(4) latcheting

24. The essential difference between kiln-fired clay and plastecine is that plastecine

(1) has an oil base while clay has a water base
(2) does not dry as fast or as well as clay does
(3) is a more expensive material than clay
(4) can be repeatedly re-used whereas kiln-fired clay cannot

25. What technique is employed to remove air from clay?

(1) casting
(2) wedging
(3) incising
(4) graffito

26. Which of the following presents the most logical order of the steps used in working with clay?

(1) wedging, carving, sanding, decorating, firing
(2) carving, sanding, wedging, firing, decorating
(3) wedging, carving, decorating, sanding, firing
(4) sanding, firing, carving, wedging, decorating

27. Which of the following is a correct statement about modeling the material make of sawdust and wheat paste?

(1) It can be baked in an oven.
(2) It disintegrates when dry.
(3) It can be used to make simple solid forms.
(4) It can be used to make thin, delicate figures.

28. In the art program what is a "scrap box"?

(1) A storage place for leftovers that can be used for rainy-day projects
(2) A collection of stimulating materials for creative activities
(3) A file of ideas that can be used to amuse students who have compleated their projects
(4) A collection of materials to be used in unplanned art activities

29. Creating with "Found Materials" requires that a child have
(1) a good supply of scrap materials
(2) a willingness to see in new ways
(3) the perserverance to keep looking for materials
(4) the motor ability to fasten materials together

GO ON TO THE NEXT PAGE

30. A mobile is best defined as

(1) a design that utilizes movable hanging shapes and space
(2) a suspended decorative design that is especially appropriate for art experience in the elementary grades
(3) an adaptable art form that consists of cut-out movable figures that can be used to illustrate stories
(4) a creative art form that lends itself to the constructive use of pieces of material from the scrap box

31. What is the most important objective of group projects?

(1) To develop the participants' individuality and an appreciation of the work of others
(2) To encourage cooperation through sharing ideas and working together toward an important goal
(3) To enable the more inhibited or less talented students to contribute to class activities
(4) To promote the discussion of the organization and goals of class activities

32. Experience in which of the following contribute most to fostering self-reliance, cooperation, responsibility, and other social habits in children?

(1) Collage
(2) Papier-mache
(3) Graphic arts
(4) Mural making

33. One of the best ways of providing an experience that may stimulate art appreciation is to have the child

(1) keep a list of painters and styles of painting
(2) copy a well-known painting
3 (3) cut out a number of art pictures from magazines for a display
(4) work in the same medium and use a technique similar to that of an artist he knows

34. Why is evaluation considered to be an important element in a student's total art experience?

(1) It enables him to observe his own growth and progress as well as that of his classmates.
(2) It helps him to benefit from the mistakes of his classmates.
(3) Through it he develops a respect for the superior students in the class.
(4) Through it he can ascertain his grade level and rank in class.

35. When should evaluation of an art experience take place?

(1) Only during the work period
(2) Only when a lesson has been completed.
(3) Whenever there are enough works to demonstrate progressive improvement
(4) Whenever the teacher feels it is needed.

36. Which of the following is generally considered to be the best way of evaluating art work in the classroom?

(1) Administering factual tests on work processes
(2) Staging contests and giving prizes for the best works
(3) Permitting the class to determine the best works by secret ballot
(4) Staging a display and having a group discussion about the merits of the works

37. Ideally, evaluation is essentially a means by which the teacher can

(1) determine if objectives have been met
(2) compute a student's numerical average
(3) decide which students to pass and which to fail
(4) identify the more talented students in a group

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38. A frame of paper or cardboard used to display a picture is called a

(1) mount
(2) block
(3) mat
(4) paste-up

39. In setting up an art display in the classroom the teacher should

(1) allow the students to make the design choices involved in the arrangement of the display
(2) make certain that the display is a comprehensive review of all lessons and that all students are represented
(3) preselect the works so that only the most successful works are displayed
(4) retain control of the selection of the works and their arrangement in the display

40. What is the chief importance to children of classroom displays of their art work?

(1) displays encourage children and give them confidence
(2) displays enhance the beauty of the children's classroom environment
(3) displays provide less talented children with ideas and works that they can copy
(4) displays encourage children to recognize talent and to foster its development

END OF TEST

APPENDIX D

Item Analysis

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 1 DRAWING

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	9	48	177	94	4	3	14	53	28	1
2	4	21	178	119	10	1	6	54	36	3
3	135	185	10	1	1	41	56	3	0	0
4	114	206	11	1	0	34	62	3	0	0
5	95	212	15	7	3	29	64	5	2	1
6	28	216	71	15	2	8	65	21	5	1
7	36	207	73	15	1	11	62	22	5	0
8	100	203	27	0	2	30	61	8	0	1
9	138	168	17	3	6	42	51	5	1	2
41	129	196	6	0	1	39	59	2	0	0
42	72	245	12	3	0	22	74	4	1	0
43	73	212	38	8	1	22	64	11	2	0
44	109	208	13	2	0	33	63	4	1	0
45	52	193	75	8	4	16	58	23	2	1
46	95	212	15	1	9	29	64	5	0	3
47	56	236	24	5	11	17	71	7	2	3
81	109	191	29	3	0	33	58	9	1	0
82	101	195	27	9	0	30	59	8	3	0
83	94	202	27	7	2	28	61	8	2	1
84	15	37	154	117	9	5	11	46	35	3
85	57	211	38	24	2	17	64	11	7	1
86	44	200	60	14	14	13	60	18	4	4
87	75	225	11	5	16	23	68	3	2	5
88	10	25	188	89	20	3	8	57	27	6
89	106	182	17	5	22	32	55	5	2	7
121	90	223	14	3	2	27	67	4	1	1
122	57	234	24	15	2	17	70	7	5	1
123	7	20	213	83	9	2	6	64	25	3
124	17	45	178	76	16	5	14	54	23	5

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 2 PAINTING

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	16	41	178	74	3	5	13	57	24	1
2	10	20	193	82	7	3	6	62	26	2
3	98	204	8	0	2	31	65	3	0	1
4	105	198	6	1	2	34	63	2	0	1
5	79	209	20	2	2	25	67	6	1	1
6	32	207	54	5	14	10	66	17	2	4
7	30	210	51	7	14	10	67	16	2	4
8	74	206	19	0	13	24	66	6	0	4
9	96	178	11	3	24	31	57	4	1	8
41	94	207	8	2	1	30	66	3	1	0
42	60	234	13	5	0	19	75	4	2	0
43	66	215	26	4	1	21	69	8	1	0
44	88	210	12	2	0	28	67	4	1	0
45	35	192	76	8	1	11	62	24	3	0
46	63	225	9	3	12	20	72	3	1	4
47	44	220	24	6	18	14	71	8	2	6
81	94	191	18	4	5	30	61	6	1	2
82	82	194	23	8	5	26	62	7	3	2
83	75	198	26	7	6	24	63	8	2	2
84	17	40	163	83	9	5	13	52	27	3
85	42	193	49	22	6	13	62	16	7	2
86	35	193	57	8	19	11	62	18	3	6
87	57	215	15	6	19	18	69	5	2	6
88	11	25	175	72	29	4	8	56	23	9
89	76	176	14	11	35	24	56	4	4	11
121	85	202	14	3	8	27	65	4	1	3
122	38	218	38	11	7	12	70	12	4	2
123	10	18	200	72	12	3	6	64	23	4
124	12	50	178	57	15	4	16	57	18	5

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 3 MOTIVATION

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	20	35	185	62	8	6	11	60	20	3
2	7	32	194	67	10	2	10	63	22	3
3	57	210	31	5	7	18	68	10	2	2
4	65	214	18	7	6	21	69	6	2	2
5	58	190	42	13	7	19	61	14	4	2
6	23	215	46	9	17	7	69	15	3	5
7	33	203	49	5	20	11	65	16	2	6
8	55	198	35	4	18	18	64	11	1	6
9	73	176	30	12	19	24	57	10	4	6
41	82	210	15	3	0	26	68	5	1	0
42	49	242	18	1	0	16	78	6	0	0
43	60	205	34	3	8	19	66	11	1	3
44	55	208	23	9	15	18	67	7	3	5
45	35	165	81	21	8	11	53	26	7	3
46	52	198	41	2	17	17	64	13	1	5
47	40	197	49	7	17	13	64	16	2	5
81	79	188	26	6	11	25	61	8	2	4
82	68	187	32	10	13	22	60	10	3	4
83	56	194	30	10	20	18	63	10	3	6
84	14	36	165	73	22	5	12	53	24	7
85	48	195	35	13	19	15	63	11	4	6
86	40	185	45	9	31	13	60	15	3	10
87	41	191	42	6	30	13	62	14	2	10
88	14	42	165	56	33	5	14	53	18	11
89	61	162	34	11	42	20	52	11	4	14
121	65	199	27	7	12	21	64	9	2	4
122	46	214	30	8	12	15	69	10	3	4
123	8	34	188	64	16	3	11	61	21	5
124	26	74	143	50	17	8	24	46	16	5

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 4 PAPER CONSTRUCTION

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	16	34	178	74	2	5	11	59	24	1
2	8	21	194	77	4	3	7	64	25	1
3	83	205	14	2	0	27	67	5	1	0
4	89	197	17	1	0	29	65	6	0	0
5	86	194	18	3	3	28	64	6	1	1
6	45	205	37	7	10	15	67	12	2	3
7	40	205	41	5	13	13	67	13	2	4
8	69	203	20	3	9	23	67	7	1	3
9	105	162	20	0	17	35	53	7	0	6
41	78	213	11	0	2	26	70	4	0	1
42	53	240	11	0	0	17	79	4	0	0
43	67	214	21	0	2	22	70	7	0	1
44	78	217	7	2	0	26	71	2	1	0
45	33	188	70	10	3	11	62	23	3	1
46	63	211	17	3	10	21	69	6	1	3
47	51	207	25	5	16	17	68	8	2	5
81	97	198	9	0	0	32	65	3	0	0
82	97	193	13	1	0	32	63	4	0	0
83	80	201	20	1	2	26	66	7	0	1
84	9	47	175	71	2	3	15	58	23	1
85	51	198	40	14	1	17	65	13	5	0
86	49	201	38	6	10	16	66	13	2	3
87	50	220	21	3	10	16	72	7	1	3
88	11	33	191	55	14	4	11	63	18	5
89	86	181	17	3	17	28	60	6	1	6
121	82	205	12	2	3	27	67	4	1	1
122	56	207	27	10	4	18	68	9	3	1
123	4	26	210	55	9	1	9	69	18	3
124	17	63	172	40	12	6	21	57	13	4

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 5 PAPER MACHE

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	37	85	178	62	1	10	23	49	17	0
2	6	20	211	122	4	2	6	58	34	1
3	77	242	37	6	1	21	67	10	2	0
4	72	249	38	4	0	20	69	10	1	0
5	88	236	30	5	4	24	65	8	1	1
6	31	227	74	16	15	9	63	20	4	4
7	19	221	87	19	17	5	61	24	5	5
8	73	242	25	7	16	20	67	7	2	4
9	89	221	23	13	17	25	61	6	4	5
41	105	240	13	2	3	29	66	4	1	1
42	50	299	12	2	0	14	82	3	1	0
43	64	255	34	10	0	18	70	9	3	0
44	70	271	16	4	2	19	75	4	1	1
45	34	210	91	23	5	9	58	25	6	1
46	54	255	32	5	17	15	70	9	1	5
47	39	233	54	13	24	11	64	15	4	7
81	89	238	20	13	3	25	66	6	4	1
82	89	223	29	18	4	25	61	8	5	1
83	73	243	28	16	3	20	67	8	4	1
84	32	104	152	68	7	9	29	42	19	2
85	40	184	88	46	5	11	51	24	13	1
86	30	178	104	35	16	8	49	29	10	4
87	42	243	42	19	17	12	67	12	5	5
88	13	24	195	107	24	4	7	54	29	7
89	61	226	24	17	35	17	62	7	5	10
121	60	241	39	11	12	17	66	11	3	3
122	30	205	79	35	14	8	56	22	10	4
123	7	18	225	94	19	2	5	62	26	5
124	31	95	173	44	20	9	26	48	12	6

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 6 ROLE OF THE TEACHER

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	15	43	180	50	19	5	14	59	16	6
2	6	24	203	55	19	2	8	66	18	6
3	33	202	51	11	10	11	66	17	4	3
4	38	222	34	6	7	12	72	11	2	2
5	28	187	62	12	18	9	61	20	4	6
6	20	192	64	7	24	7	63	21	2	8
7	20	201	54	8	24	7	65	18	3	8
8	43	207	31	7	19	14	67	10	2	6
9	49	176	46	14	22	16	57	15	5	7
41	63	225	16	2	1	21	73	5	1	0
42	40	241	24	2	0	13	79	8	1	0
43	25	216	42	4	20	8	70	14	1	7
44	31	210	27	6	33	10	68	9	2	11
45	17	179	90	10	11	6	58	29	3	4
46	25	200	36	11	35	8	65	12	4	11
47	23	199	52	7	26	7	65	17	2	8
81	52	195	34	5	21	17	64	11	2	7
82	50	187	42	5	23	16	61	14	2	7
83	33	194	33	11	36	11	63	11	4	12
84	15	54	161	40	37	5	18	52	13	12
85	36	179	45	10	37	12	58	15	3	12
86	18	165	61	13	50	6	54	20	4	16
87	24	180	48	7	48	8	59	16	2	16
88	9	25	185	39	49	3	8	60	13	16
89	38	177	34	8	50	12	58	11	3	16
121	31	202	36	5	33	10	66	12	2	11
122	27	200	36	8	36	9	65	12	3	12
123	8	21	187	51	40	3	7	61	17	13
124	17	68	144	35	43	6	22	47	11	14

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 7 PUPPETRY

QUESTION	NUMBER OF CASES RESPONSE 1	2	3	4	OMIT	PERCENT OF GROUP RESPONSE 1	2	3	4	OMIT
1	11	22	187	98	3	3	7	58	31	1
2	7	12	200	95	7	2	4	62	30	2
3	99	206	12	0	4	31	64	4	0	1
4	96	210	12	0	3	30	65	4	0	1
5	89	214	8	4	6	28	67	2	1	2
6	55	215	39	5	7	17	67	12	2	2
7	53	219	42	3	4	17	68	13	1	1
8	70	225	14	3	9	22	70	4	1	3
9	113	181	11	1	15	35	56	3	0	5
41	87	220	12	0	2	27	69	4	0	1
42	52	255	14	0	0	16	79	4	0	0
43	61	240	17	2	1	19	75	5	1	0
44	71	233	13	2	2	22	73	4	1	1
45	33	200	79	8	1	10	62	25	2	0
46	49	252	11	1	8	15	79	3	0	2
47	56	225	27	2	11	17	70	8	1	3
81	84	215	8	4	10	26	67	2	1	3
82	86	199	21	4	11	27	62	7	1	3
83	68	214	23	7	9	21	67	7	2	3
84	11	48	184	66	12	3	15	57	21	4
85	46	198	52	15	10	14	62	16	5	3
86	40	208	48	4	21	12	65	15	1	7
87	47	228	19	4	23	15	71	6	1	7
88	11	17	205	62	26	3	5	64	19	8
89	91	186	11	4	29	28	58	3	1	9
121	67	239	10	0	5	21	74	3	0	2
122	51	212	38	13	7	16	66	12	4	2
123	5	14	219	72	11	2	4	68	22	3
124	20	64	176	48	13	6	20	55	15	4

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 8 EVALUATION

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	21	45	198	45	7	7	14	63	14	2
2	5	17	217	68	9	2	5	69	22	3
3	42	204	50	11	9	13	65	16	3	3
4	40	217	45	8	6	13	69	14	3	2
5	36	185	64	14	17	11	59	20	4	5
6	23	180	85	16	12	7	57	27	5	4
7	28	185	78	13	12	9	59	25	4	4
8	42	202	50	10	12	13	64	16	3	4
9	44	167	59	23	23	14	53	19	7	7
41	58	234	21	2	1	18	74	7	1	0
42	37	251	24	2	2	12	79	8	1	1
43	32	214	42	14	14	10	68	13	4	4
44	37	202	37	8	32	12	64	12	3	10
45	20	165	102	16	13	6	52	32	5	4
46	24	222	45	5	20	8	70	14	2	6
47	33	190	48	19	26	10	60	15	6	8
81	46	200	41	6	23	15	63	13	2	7
82	46	185	51	10	24	15	59	16	3	8
83	31	203	43	7	32	10	64	14	2	10
84	12	45	175	51	33	4	14	55	16	10
85	28	206	39	13	30	9	65	12	4	9
86	23	181	58	13	41	7	57	18	4	13
87	24	202	42	6	42	8	64	13	2	13
88	10	39	180	38	49	3	12	57	12	16
89	36	166	36	22	56	11	53	11	7	18
121	32	207	44	8	25	10	66	14	3	8
122	23	226	35	8	24	7	72	11	3	8
123	5	33	205	46	27	2	10	65	15	9
124	21	82	161	19	33	7	26	51	6	10

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 9 PRINTING

QUESTION	NUMBER OF CASES RESPONSE 1	2	3	4	OMIT	PERCENT OF GROUP RESPONSE 1	2	3	4	OMIT
1	14	33	207	59	2	4	10	66	19	1
2	6	15	219	69	6	2	5	70	22	2
3	59	228	25	2	1	19	72	8	1	0
4	50	243	19	2	1	16	77	6	1	0
5	58	234	21	1	1	18	74	7	0	0
6	21	239	43	5	7	7	76	14	2	2
7	24	234	45	4	8	8	74	14	1	3
8	40	244	20	1	10	13	77	6	0	3
9	72	208	15	4	16	23	66	5	1	5
41	55	249	10	1	0	17	79	3	0	0
42	32	271	11	1	0	10	86	3	0	0
43	45	244	22	4	0	14	77	7	1	0
44	45	255	15	0	0	14	81	5	0	0
45	17	196	90	9	3	5	62	29	3	1
46	34	254	20	0	7	11	81	6	0	2
47	33	239	29	3	11	10	76	9	1	3
81	65	233	10	4	3	21	74	3	1	1
82	76	211	21	4	3	24	67	7	1	1
83	40	240	30	2	3	13	76	10	1	1
84	9	54	182	64	6	3	17	58	20	2
85	33	230	32	16	4	10	73	10	5	1
86	25	229	43	4	14	8	73	14	1	4
87	29	245	25	2	14	9	78	8	1	4
88	7	33	208	50	17	2	10	66	16	5
89	64	200	15	1	35	20	63	5	0	11
121	42	253	15	3	2	13	80	5	1	1
122	32	238	33	10	2	10	76	10	3	1
123	4	17	223	67	4	1	5	71	21	1
124	16	78	173	38	10	5	25	55	12	3

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 10 WEAVING AND STITCHING

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	16	39	187	69	3	5	12	60	22	1
2	8	11	208	83	4	3	4	66	26	1
3	59	222	29	2	2	19	71	9	1	1
4	54	229	26	3	2	17	73	8	1	1
5	61	226	21	2	4	19	72	7	1	1
6	31	209	61	8	5	10	67	19	3	2
7	36	209	58	4	7	11	67	18	1	2
8	48	226	29	5	6	15	72	9	2	2
9	60	206	27	8	13	19	66	9	3	4
41	59	247	3	2	3	19	79	1	1	1
42	36	262	11	2	3	11	83	4	1	1
43	49	244	19	2	0	16	78	6	1	0
44	54	245	12	1	2	17	78	4	0	1
45	23	188	94	4	5	7	60	30	1	2
46	36	242	16	2	18	11	77	5	1	6
47	37	220	30	4	23	12	70	10	1	7
81	67	229	13	4	1	21	73	4	1	0
82	69	220	18	7	0	22	70	6	2	0
83	53	216	29	16	0	17	69	9	5	0
84	15	51	185	60	3	5	16	59	19	1
85	42	212	49	10	1	13	68	16	3	0
86	28	211	56	8	11	9	67	18	3	4
87	35	228	28	10	13	11	73	9	3	4
88	6	29	200	63	16	2	9	64	20	5
89	62	196	21	6	29	20	62	7	2	9
121	50	235	18	4	7	16	75	6	1	2
122	37	207	49	12	9	12	66	16	4	3
123	3	13	223	64	11	1	4	71	20	4
124	17	75	172	42	8	5	24	55	13	3

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 11 GROUP ACTIVTIES

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	6	33	184	64	3	2	11	63	22	1
2	4	22	200	60	4	1	8	69	21	1
3	48	220	19	2	1	17	76	7	1	0
4	52	220	14	2	2	18	76	5	1	1
5	37	216	25	5	7	13	74	9	2	2
6	22	213	38	5	12	8	73	13	2	4
7	22	212	40	5	11	8	73	14	2	4
8	36	217	21	3	13	12	75	7	1	4
9	48	204	17	5	16	17	70	6	2	6
41	51	229	7	1	2	18	79	2	0	1
42	31	247	10	1	1	11	85	3	0	0
43	39	227	18	3	3	13	78	6	1	1
44	30	240	15	3	2	10	83	5	1	1
45	14	176	89	7	4	5	61	31	2	1
46	33	229	15	1	12	11	79	5	0	4
47	30	213	26	2	19	10	73	9	1	7
81	48	207	19	5	11	17	71	7	2	4
82	44	194	34	7	11	15	67	12	2	4
83	35	214	23	7	11	12	74	8	2	4
84	8	37	174	54	17	3	13	60	19	6
85	23	205	39	10	13	8	71	13	3	4
86	20	195	46	8	21	7	67	16	3	7
87	24	200	37	7	22	8	69	13	2	8
88	2	43	173	46	26	1	15	60	16	9
89	32	170	37	11	40	11	59	13	4	14
121	36	228	17	2	7	12	79	6	1	2
122	28	209	33	12	8	10	72	11	4	3
123	3	14	201	61	11	1	5	69	21	4
124	10	72	160	36	12	3	25	55	12	4

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 12 MODELING AND SCULPTURE

QUESTION	NUMBER OF CASES RESPONSE 1	2	3	4	OMIT	PERCENT OF GROUP RESPONSE 1	2	3	4	OMIT
1	7	36	177	50	5	3	13	64	18	2
2	7	22	188	51	7	3	8	68	19	3
3	42	209	13	4	7	15	76	5	1	3
4	34	218	15	2	6	12	79	5	1	2
5	40	211	17	0	7	15	77	6	0	3
6	18	207	34	3	13	7	75	12	1	5
7	17	213	31	1	13	6	77	11	0	5
8	46	190	19	2	18	17	69	7	1	7
9	51	186	16	4	18	19	68	6	1	7
41	45	222	5	1	2	16	81	2	0	1
42	27	230	13	1	4	10	84	5	0	1
43	36	220	11	2	6	13	80	4	1	2
44	39	219	16	1	0	14	80	6	0	0
45	19	172	63	12	9	7	63	23	4	3
46	29	216	14	0	16	11	79	5	0	6
47	26	199	26	3	21	9	72	9	1	8
81	45	197	16	1	16	16	72	6	0	6
82	61	179	18	3	14	22	65	7	1	5
83	36	186	34	5	14	13	68	12	2	5
84	16	59	148	36	16	6	21	54	13	6
85	25	184	40	9	17	9	67	15	3	6
86	25	178	38	5	29	9	65	14	2	11
87	27	197	16	7	28	10	72	6	3	10
88	8	26	162	52	27	3	9	59	19	10
89	35	180	20	5	35	13	65	7	2	13
121	37	216	16	2	4	13	79	6	1	1
122	28	193	40	8	6	10	70	15	3	2
123	8	17	186	58	6	3	6	68	21	2
124	15	62	157	31	10	5	23	57	11	4

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 13 ART APPRECIATION

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	11	44	170	41	11	4	16	61	15	4
2	5	16	199	48	9	2	6	72	17	3
3	35	199	29	5	9	13	72	10	2	3
4	31	207	23	6	10	11	75	8	2	4
5	33	187	33	6	18	12	68	12	2	6
6	23	179	41	11	16	8	65	17	4	6
7	25	177	41	11	16	9	64	17	4	6
8	30	196	30	5	16	11	71	11	2	6
9	36	171	39	7	24	13	62	14	3	9
41	37	222	14	2	2	13	80	5	1	1
42	27	234	13	1	2	10	84	5	0	1
43	36	212	20	2	7	13	77	7	1	3
44	35	221	17	3	1	13	80	6	1	0
45	20	160	79	13	5	7	58	29	5	2
46	31	213	20	6	7	11	77	7	2	3
47	25	200	35	7	10	9	72	13	3	4
81	47	197	14	1	18	17	71	5	0	6
82	50	176	20	1	20	18	67	7	0	7
83	33	176	42	5	21	12	64	15	2	8
84	11	56	144	42	24	4	20	52	15	9
85	29	192	26	8	22	10	69	9	3	8
86	24	173	44	7	29	9	62	16	3	10
87	27	189	26	3	32	10	68	9	1	12
88	7	36	166	35	33	3	13	60	13	12
89	31	172	28	5	41	11	62	10	2	15
121	35	204	26	2	10	13	74	9	1	4
122	31	202	24	7	13	11	73	9	3	5
123	8	17	187	49	16	3	6	68	18	6
124	10	58	162	31	16	4	21	58	11	6

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 14 SCRAP MATERIALS

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	12	22	191	64	19	4	7	62	21	6
2	2	28	200	64	14	1	9	65	21	5
3	54	222	17	1	14	18	72	6	0	5
4	53	224	17	3	11	17	73	6	1	4
5	50	222	16	2	18	16	72	5	1	6
6	27	225	35	2	19	9	73	11	1	6
7	30	224	31	3	20	10	73	10	1	6
8	39	223	19	1	26	13	72	6	0	8
9	59	196	15	7	31	19	64	5	2	10
41	49	244	6	2	7	16	79	2	1	2
42	35	261	7	2	3	11	85	2	1	1
43	44	242	12	2	8	14	79	4	1	3
44	59	226	13	4	6	19	73	4	1	2
45	26	181	75	9	17	8	59	24	3	6
46	31	240	10	2	25	10	78	3	1	8
47	33	230	18	3	24	11	75	6	1	8
81	66	220	11	1	10	21	71	4	0	3
82	69	214	15	2	8	22	69	5	1	3
83	60	205	27	6	10	19	67	9	2	3
84	8	49	172	70	9	3	16	56	23	3
85	39	222	25	7	15	13	72	8	2	5
86	33	221	26	2	26	11	72	8	1	8
87	33	221	19	5	30	11	72	6	2	10
88	5	40	190	42	31	2	13	62	14	10
89	60	197	11	5	35	19	64	4	2	11
121	53	233	10	4	8	17	76	3	1	3
122	42	227	24	8	7	14	74	8	3	2
123	7	18	222	51	10	2	6	72	17	3
124	16	82	164	35	11	5	27	53	11	4

COURSE EVALUATION SURVEY
ART FOR ELEMENTARY TEACHERS

LESSON 15 DISPLAY AND SUMMARY

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	4	21	139	46	10	2	10	63	21	5
2	4	15	152	40	9	2	7	69	18	4
3	43	161	7	1	8	20	73	3	0	4
4	38	168	10	1	3	17	76	5	0	1
5	28	136	14	5	37	13	62	6	2	17
6	23	150	25	4	18	10	68	11	2	8
7	20	153	19	7	21	9	70	9	3	10
8	34	168	7	2	9	15	76	3	1	4
9	42	156	10	3	9	19	71	5	1	4
41	35	134	3	0	48	16	61	1	0	22
42	26	144	2	0	48	12	65	1	0	22
43	23	125	6	1	65	10	57	3	0	30
44	25	133	6	1	55	11	60	3	0	25
45	15	99	38	3	65	7	45	17	1	30
46	17	121	10	1	71	8	55	5	0	32
47	22	117	14	2	65	10	53	6	1	30
81	20	69	4	2	125	9	31	2	1	57
82	21	67	8	0	124	10	30	4	0	56
83	17	65	10	2	126	8	30	5	1	57
84	3	16	46	26	129	1	7	21	12	59
85	16	66	8	3	127	7	30	4	1	58
86	18	61	8	1	132	8	28	4	0	60
87	14	63	10	2	131	6	29	5	1	60
88	5	16	49	14	136	2	7	22	6	62
89	18	57	5	3	137	8	26	2	1	62
121	21	85	5	2	107	10	39	2	1	49
122	15	74	9	4	118	7	34	4	2	54
123	2	7	64	23	124	1	3	29	10	56
124	12	23	54	15	116	5	10	25	7	53

APPENDIX E

Teacher Inventory - Part I

WENH-TV/UNH

SCIENCE FOR TEACHERS

General Directions for the TEACHER INVENTORY

PART I -- Part I of the Teacher Inventory is to be completed by the teacher at the pre-course Orientation Meeting. Information provided in Part I will be kept on file by the Regional Instructor and returned to the Project Director following the final meeting of the class. Items in this section are for general information purposes only and will in no way affect either your grade or presence in the course. Please respond to these items as completely as possible. Record your name and other information requested directly on the teacher inventory booklet. Use the reverse side of the page(s) if you need more room to record your responses to the items.

PART II - Part II of the Teacher Inventory is to be completed by the teacher at the pre-course Orientation Meeting and recorded on a separate answer sheet. DO NOT WRITE IN THE BOOKLET in responding to items in Part II. The completed response documents will be sent directly to BERTS by the Regional Instructor. These data are to be used for research purposes only and will in no way affect either your grade or presence in the course. We are simply gathering information that could be of assistance in examining the status of elementary school science programs in New Hampshire and in recommending meaningful improvements.

SCIENCE IN THE ELEMENTARY SCHOOL

TEACHER INVENTORY - PART I

Part I of the Teacher Inventory is to be completed by the student at the pre-course Orientation Meeting. It will be kept on file by the Regional Instructor and returned to the Project Director following the final meeting of the course.

PLEASE PRINT

1. NAME________________________ 2. BIRTH DATE____________

3. DEGREE HELD________________________ 4. YEAR GRANTED____________

5. DEGREE GRANTING INSTITUTION________________________

6. POST-GRADUATE ACADEMIC ACTIVITY IN SCIENCE (e.g., extension courses, summer sessions, NSF Institutes, seminars, workshops,etc.). Give name of institution, course title (if applicable), and date (s) of attendance.

Institution	Title	Date

7. TOTAL NUMBER OF YEARS TEACHING EXPERIENCE (as of September 1, 1967)

__________ years

8. NUMBER OF YEARS TEACHING AT:

________(a) Primary level (K-3)
________(b) Intermediate level (4-6)
________(c) Junior High level (7-8) in____________________subjects.
________(d) High School level (9-12) in____________________subjects.

9. OTHER EXPERIENCE IN EDUCATION (e.g., administration, consulting, guidance, department chairman, etc.).

____

____

10. NON-EDUCATIONAL PROFESSIONAL EXPERIENCE________________________

____

11. PRESENT TEACHING ROLE(S) AND ASSIGMENT(S): (Complete as apply)

Role	Grade(s)	Subject(s)
Substitute		
Teacher		
Supervisor		
Other (specify)		

12. IS YOUR CLASSROOM SELF-CONTAINED: (Check One)

________(a) Yes
________(b) No

13. IF "YES" (self-contained): (Complete all items)

________(a) Number of pupils in your class;
________(b) Number of science periods per week;
________(c) Length (time) of each science period.

14. IF "NO" (departmentalized); (Complete all items)

________(a) Number of science divisions taught;
________(b) Number of science periods per division each week;
________(c) Length (time) of each science period;
________(d) Total number of pupils in all science classes you teach.

15. PLEASE RESPOND TO ALL OF THE FOLLOWING ITEMS:

Yes	No	
		(a) Does your school have a science guide for the grade you teach?
		(b) Did you participate in the development or revision of this guide?
		(c) Are you required to follow this guide with your science classes?
		(d) Do you feel that this guide needs further revision?

(e) Who developed this guide? ____

____

(f) When was this guide developed or most recently revised? ____________
(year)

16. PLEASE RESPOND TO THE FOLLOWING ITEMS:

Yes	No	
_____	_____	(a) Is your school served by a science consultant, coordinator, or supervisor? (If "No", mark the "no" column and then skip to Item 17)
_____	_____	(b) Does this individual make regularly scheduled visits to your room?
_____	_____	(c) Does this individual consult with you at regular intervals outside the classroom?
_____	_____	(c) Is this individual available to consult with you at your request?

(e) What services does this individual provide? ____________________

____

(f) What additional services do you wish this person would provide?

____

____

17. IF YOUR SCHOOL DOES NOT HAVE A SCIENCE CONSULTANT, PLEASE RESPOND TO THE FOLLOWING ITEMS: (If you have a consultant, skip to item 18)

Yes	No	
_____	_____	(a) If your school is not presently served by a science consultant, would you like to have one available?

(b) What services would you like to have him (her) provide? ____________________

____

____

18. PLEASE RESPOND TO THE FOLLOWING ITEMS:

Yes	No	
_____	_____	(a) Do your pupils have a science text for your course(s)? (If "yes", complete items (b)-(d) below.

(b) Name of text(s)	(c) Publisher	(d) Copyright Date

THANK YOU

APPENDIX F

Teacher Inventory - Part II

SCIENCE IN THE ELEMENTARY SCHOOL

Teacher Inventory - Part II

SECTION A: Please respond to each of the following items (1-19) according to the lead question for each sub-group of items. Record your "Yes" responses to the items by marking the "1" position on the answer sheet; record "no" responses by marking the "2" position on the separate answer sheet. Please respond to all items.

I. Have you ever used, or seen used, any of the science units developed by the following groups: (Items 1-5 on answer sheet)

1. AAAS
2. ESS
3. SCIS
4. ASCAP
5. Other groups

II. Do you presently receive the news letters published by any of the following groups: (Items 6-10)

6. AAAS
7. ESS
8. SCIS
9. ASCAP
10. Other Groups

III. Are you presently a member of any of the following organizations: (Items 11-15)

11. NHSTA
14. ESS
13. NHEA
15. ASCAP
15. Other Professional Organizations

IV. Do you personally subscribe to any of the following publications: (Items 16-19)

16. Science and Children
17. The Science Teacher
18. The Instructor
19. Other professional publications

SECTION B: You are asked below to rate the importance of each of the following subjects at the grade level you teach. Please use the scale indicated below and its corresponding numerical code in recording your ratings on the separate answer sheet. Respond to all items even though you may not teach these subjects or even if these subjects are not included in your curriculum program. (Items 20-31)

Scale: 1 = essential
2 = desirable but not essential
3 = neither essential nor desirable

20. mathematics
21. penmanship
22. science
23. language arts
24. art
25. social studies
26. foreign languages
27. pyhsical education
28. reading
29. music
30. drama
31. other

SECTION C: You are asked to rate the value of each of the following activities in meeting the goals of an elementary science program. After reading each of the activities listed below (Items 32-49), record your value rating of each activity by using the rating scale noted below. Mark your responses on the separate answer sheet just as you have done in the preceding section. Please respond to all items.

Scale:
1 = substantial value
2 = moderate value
3 = little or no value

32. classwork written answers to textbook questions;
33. classwork oral answers to textbook questions;
34. classwork reading assignments in a textbook;
35. homework written answers to textbook questions;
36. homework reading assignments in a textbook;
37. written reports on assigned topics;
38. oral reports on assigned topics;
39. science films;
40. science film strips or film loops;
41. class subscriptions to elementary science newspapers or magazines;
42. teacher demonstrations;
43. activities carried out by the pupils in class using simple materials;
44. activities carried out by pupils at home using simple materials;
45. commercial scale models;
46. science fairs;
47. field trips;
48. guest speakers;
49. class discussions.

SECTION D: Textbooks and professional publications often state the importance of goals in the development of an elementary science program. We have selected three commonly used "goals" in items 50-53 below and would like your opinion as to how you would rate each of these goals in your science program. Please use the scale presented below and respond to each item as you include (or would include) them in your science program.

Scale:
1 = primary goal
2 = secondary goal
3 = incidental goal

50. preparing children for a career in some field of science;
51. preparing children for life in a science-oriented society;
52. preparing children for the study of science at the next grade level

SECTION E: Which of the following statements do you think will (would) be of value to children in meeting the goals of your science program (Items 53-58). Again, use the scale below in responding to each item in the series.

Scale: 1 = substantial value
2 = moderate value
3 = little or no value

53. problem-solving skills and abilities;
54. knowledge of science laws, facts, and principles;
55. familiarity with the things that make up their environment;
56. an active curiosity;
57. self-reliance, self-confidence, and self-respect;
58. respect for the rights and opinions of others.

SECTION F: Presented below are several questions related to your school, its facilities, and your self-rating as an elementary science teacher. Please respond to each item and record your response on the separate answer sheet according to the key provided under each item. Be honest, not modest! (Items 59-66)

59. Rate the abundance of materials available for use in your science classes:

(1) sufficient
(2) limited
(3) insufficient

60. How much money is available during the school year for your use in obtaining supplies: (if none, leave blank)

(1) $1-25
(2) $26-50
(3) $51-75
(4) $76-100
(5) More than $100

61. What is the principal source of this money (see Item 60):

(1) school district
(2) parent organizations
(3) you, the teacher
(4) student organizations
(5) other

62. Do you enjoy teaching science:

(1) almost always
(2) occasionally
(3) seldom
(4) almost never

63. Do most of your pupils enjoy science:

(1) almost always
(2) occasionally
(3) seldom
(4) almost never

64. How do you rate your science background in terms of technical knowledge:

(1) excellent
(2) good
(3) fair
(4) poor

65. How do you rate your ability to teach elementary school science:

(1) excellent
(2) good
(3) fair
(4) poor

66. How do you rate your understanding of the more recent approaches toward the teaching of elementary school science:

(1) excellent
(2) good
(3) fair
(4) poor

SECTION G: Listed below are several characteristics which are descriptive of most teachers. We would like you to rate the value of each of the following characteristics to a teacher of elementary science. Please use the rating scale noted below in responding to each ite. (Items 67-73)

Scale: 1 == substantial value
2 == moderate value
3 == little or no value

67. an understanding of how children learn;
68. knowledge of scientific facts, laws, and principles;
69. an active curiosity;
70. self-reliance, self-confidence, and self-respect;
71. respect for the rights and opinions of others;
72. a sense of humor;
73. familiarity with the things that make up the environment.

SECTION H: The final series of items deals with statements concerning the teaching of science in the elementary school. Using the four-point scale noted below, select and mark the category that best describes your reaction to each statement. (Items 74-86)

Scale:
1 = strongly agree
2 = agree slightly
3 = disagree slightly
4 = strongly disagree

74. The information provided in the textbook is enough for me to teach my pupils.

75. They're trying to get elementary teachers to teach more and more junior high school science in the lower grades.

76. The average elementary teacher can teach science as well as she can teach any other subject in the elementary curriculum.

77. If a person doesn't care about science, he shouldn't have to study it.

78. Elementary school children at the grade level I teach lack the intellectual maturity to perform science experiments.

79. My major difficulty in teaching science is lack of time.

80. My major difficulty in teaching science is lack of subject matter background.

81. My major difficulty in teaching science is lack of adequate equipment.

82. I seldom have any real difficulty in teaching science.

83. Science should be taught only to pupils with above-average ability.

84. Science is so complicated that you can't really teach it to elementary school pupils.

85. Teachers in the elementary grades should use the same textbook for the whole class so that all students will cover the same content.

86. Modern science is so complicated that most teachers can't really understand it.

PLEASE SCAN YOUR ANSWER SHEET AND ERASE COMPLETELY ALL STRAY MARKS.

THANK YOU

APPENDIX G

Teacher Inventory - Part II, Form B

WENH-TV/UNH

SCIENCE FOR TEACHERS

General Directions
for the
TEACHER INVENTORY

Part II (Form B) of the Teacher Inventory is to be completed by the Teacher and recorded on a separate answer sheet. DO NOT WRITE IN THE BOOKLET in responding to items in Part II. The completed response documents will be sent directly to BERTS by the Regional Instructor. These data are to be used for research purposes only and will in no way affect your grade in the course. We are simply gathering information that could be of assistance in examining the status of elementary school science programs in New Hampshire and in recommending meaningful improvements.

SCIENCE IN THE ELEMENTARY SCHOOL
Teacher Inventory Part II Form B

SECTION A: You are asked below to rate the importance of each of the following subjects at the grade level you teach. Please use the scale indicated below and its corresponding numerical code in recording your ratings on the separate answer sheet. Respond to all items even though you may not teach these subjects or even if these subjects are not included in your curriculum program. (Items 1-12)

Scale: 1 = essential
2 = desirable
3 = neither essential nor desirable

1. mathematics
2. penmanship
3. science
4. language arts
5. art
6. social studies
7. foreign languages
8. physical education
9. reading
10. music
11. drama
12. other

SECTION B: You are asked to rate the value of each of the following activities in meeting the goals of an elementary science program. After reading each of the activities listed below (Items 13 - 30), record your value rating of each activity by using the rating scale noted below. Mark your responses on the separate answer sheet just as you have done in the preceding section. Please respond to all items.

Scale; 1 = substantial value
2 = moderate value
3 = little or no value

13. classwork written answers to textbook questions;
14. classwork oral answers to textbook questions;
15. classwork reading assignments in a textbook;
16. homework written answers to textbook questions;
17. homework reading assignments in a textbook;
18. written reports on assigned topics;
19. oral reports on assigned topics;
20. science films;
21. science film strips or film loops;
22. class subscriptions to elementary science newspapers or magazines;
23. teacher demonstrations;
24. activities carried out by the pupils in class using simple materials;
25. activities carried out by pupils at home using simple materials;
26. commercial scale models;
27. science fairs;
28. field trips;
29. guest speakers;
30. class discussions.

SECTION C: Textbooks and professional publications often state the importance of goals in the development of an elementary science program. We have selected three commonly used "goals" in items 31-33 below and would like your opinion as to how you would rate each of these goals in your science program. Please use the scale presented below and respond to each item as you include (or would include) them in your science program.

Scale: 1 = primary goal
2 = secondary goal
3 = incidental goal

31. preparing children for a career in some field of science;
32. preparing children for life in a science oriented society;
33. preparing children for the study of science at the next grade level

SECTION D: Which of the following statements do you think will (would) be of value to children in meeting the goals of your science program (Items 34-39). Again, use the scale below in responding to each item in the series.

Scale; 1 = substantial value
2 = moderate value
3 = little or no value

34. problem-solving skills and abilities;
35. knowledge of science laws, facts, and principles;
36. familiarity with the things that make up their environment;
37. an active curiosity;
38. self-reliance, self-confidence and self-respect;
39. respect for the rights and opinions of others.

SECTION: E Listed below are several characteristics which are descriptive of most teachers. We would like you to rate the value of each of the following characteristics to a teacher of elementary science. Please use the rating scale noted below in responding to each item (Items 40-48).

1=essential
2= substantial value
3=moderate value
4=irrelevent

40. a sense of humor
41. a knowledge of scientific facts, laws and principles
42. an understanding of how children learn
43. an active curiosity
44. self-reliance; self-confidence
45. a feeling of affection toward children
46. a knowledge of the historical development of science
47. the ability to impart information
48. an understanding of how children look at the world they live in

SECTION F: The final series of items deals with statements concerning the teaching of science in the elementary school. Using the four-point scale noted below, select and mark the category that best describes your reaction to each statement. (Items 49-61)

Scale: 1 = strongly agree
2 = agree slightly
3 = disagree slightly
4 = strongly disagree

49. The information provided in the textbook is enough for me to teach my pupils.

50. They are trying to get elementary teachers to teach more and more junior high school science in the lower grades.

51. The average elementary teacher can teach science as well as she can teach any other subject in the elementary curriculum.

52. If a person does't care about science, he shouldn't have to study it.

53. Elementary school schildren at the grade level I teach lack the intellectual maturity to perform science experiments.

54. My major difficulty in teaching science is lack of time.

55. My major difficulty in teaching science is lack of subject matter background.

56. My major difficulty in teaching science is lack of adequate equipment.

57. I seldom have any real difficulty in teaching science.

58. Science should be taught only to pupils with above-average ability.

59. Science is so complicated that you cannot really teach it to elementary school pupils.

60. Teachers in the elementary grades should use the same textbook for the whole class so that all students will cover the same content.

61. Modern science is so complicated that most teachers cannot really understand it.

SECTION G: The statements below were extracted from various Overviews in the Teacher's Study Guide. Please use the following rating scale to indicate your reaction to each statement (Items 62-81).

1 = unqualified agreement
2 = qualified agreement
3 = qualified disagreement
4 = unqualified disagreement

62. The relatively small amount of factual scientific information that a child may assimilate in the elementary grades will have little relevance to the problems he will face as an adult. (I)

63. There are fundamental skills and universal understandings that can be applied to the successful resolution of any problem. (I)

64. Traditional elementary science programs will not help children to prepare to deal with the great problems that the environment presents. (I)

65. Children instinctively know that in order for them to deal effectively with their environment they must first understand it. (II)

66. The things which arouse a child's curiosity are legitimate topics for serious investigation. (II)

67. Allowing each pupil to pursue his own particular interest is not an appropriate way of guiding children into science activities. (III)

68. The first step in planning science activities is to decide what skills and understandings will probably be of most value to children whenever they attempt to satisfy their curiosity. (III)

69. Teachers of science in the elementary grades should not impose their own interpretation of the significance of natural phenomena upon the children they teach. (IV)

70. Children should be encouraged to invent their own measuring systems before being exposed to the standardized systems commonly used by adults.

71. An experiment proves nothing. All an experiment can do is produce information. (VI)

72. It is better not to use any text at all in a science program if the only alternative is a single text. (VII)

73. Written reference materials should not be used before the third grade in a science program. (VII)

74. A child's science experiences should not be restricted entirely to direct experiences with materials from his environment. (VII)

75. Audio-visual materials can be valuable supplements to a child's direct experiences in science. (X)

76. Models are as helpful to children engaged in scientific inquiry as they are to working scientists.

77. There is little value in requiring a child to memorize a few of the classification systems used by scientists. (X)

78. The classification systems a child invents need not resemble those used by scientists or other adults. (X)

79. Field trips in the science program should not be guided tours. (XIII)

80. A science field trip should arouse questions at least as often as it answers them. (XIII)

81. Teachers cannot accuarately measure the effectiveness of their science programs until they know exactly what they want these programs to accomplish. (XV)

PLEASE SCAN YOUR ANSWER SHEET AND REMOVE ALL STRAY MARKS

THANK YOU

APPENDIX H

Course Evaluation

COURSE EVALUATION SURVEY

Science for Elementary Teachers

EVALUATION DATE - LESSON CODE -CONTENT TITLE

Feb. 12	Lesson 001	Elementary Science Today
Feb. 19	Lesson 002	Activity-Centered Science
Mar. 4	Lesson 003	Planning Science Activites
Mar. 11	Lesson 004	Observation-A Science Skill
Mar. 18	Lesson 005	Measurement-Another Skill
Mar. 25	Lesson 006	Conducting Experiments
Apr. 1	Lesson 007	Supplementing Direct Experiences
Apr. 8	Lesson 008	Evaluating Pupil Progress
Apr. 15	Lesson 009	Models and AV Aids
Apr. 29	Lesson 010	Classroom Plants and Animals
May 6	Lesson 011	Collecting & Classifying
May 13	Lesson 012	The Outdoor Laboratory
May 20	Lesson 013	The Field Trip
May 27	Lesson 014	New Programs in Elementary Science
June 3	Lesson 015	Evaluating Your Science Program

QUESTIONNAIRE

A. The Television Lesson (Section I on Answer Sheet)

1. The subject-matter content was too advanced for the grade I teach.
2. The subject-matter content was too elementary for the grade I teach.
3. The TV lesson suggested ideas for activities I will conduct with my pupils.
4. The TV lesson suggested teaching techniques that I will try in my classroom.
5. The lesson was a meaningful introduction to the work-session that followed.
6. Filmed classroom segments adequately related concepts of the lesson to my classroom.
7. Studio segments with children were realistic and applicable to my pupils.
8. Studio demonstrations allowed me to better understand the main idea of the lesson.
9. This television lesson should be repeated in another year.

B. The Study Guide (Section II on the Answer Sheet)

41. The study guide provided a meaningful introduction to the TV lesson.
42. The discussion questions were pertinent to the general topic of the lesson.
43. Directions for the work-session were sufficiently clear and comprehensive.
44. The suggested materials list was sufficiently specific and understandable.
45. I plan to use at least one of the bibliographical references noted in the guide.
46. The study guide allowed me to plan follow-up activities for my own class.
47. The study guide for this lesson needs no major revision.

C. The Work Session (Section III on the Answer Sheet)

81. The purpose of the work-session was clear and comprehensive.
82. The work-session was well organized and interesting.
83. I had no difficulty providing suggested materials for this work-session.
84. The materials for this work-session were difficult to work with.
85. Sufficient time was allowed to complete the work-session activity.
86. The work-session activity needs no major revision for use with my pupils.
87. The work-session helped me to plan follow-up activities for my own classroom.
88. Too much time was allowed for completion of the work-session activity.
89. This work-session activity should be repeated in another year.

D. The Classroom Follow-up (Section IV on the Answer Sheet)

121. The suggested follow-up activity for this lesson was appropriate and valuable.
122. Sufficient time was allowed for follow-up activity.
123. Too much time was allowed for follow-up activity.
124. Follow-up activity needs major revision before being repeated in another year.

THANK YOU

APPENDIX I

Review Test

WENH-TV

ELEMENTARY SCIENCE

Review Test

General Directions

You will have 30 minutes in which to take this test. When you are told to begin, turn the page, read the directions at the top of the page, and start immediately to work on the test.

Do not spend too much time on any one question. If a question seems to be too difficult, make the most careful guess you can rather than waste time over it. Your score will be the correct answers you mark.

Give only one answer to each question. Questions for which you mark two or more answers will not be counted. If you make a mistake or wish to change an answer, be sure to erase your first answer completely.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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SCIENCE REVIEW TEST

A. It is late October, and the class has spent several days examining some rocks they have collected and brought to school. They teacher on this particular day is leading a discussion of the children's observations. She hopes this discussion will lead the children to begin thinking of ways to classify these rocks. Mid-way through the period, a child raises his hand and asks, "why do the leaves on different trees turn different colors in the Fall?" The teacher replied, "That's an interesting question. Let's find out what the rest of the class thinks. Does anyone have any ideas?"

1. Which of the following, if any, do you think would have been a more appropriate response?

    1. That's an interesting question. What do you think?
    2. That's an interesting question. I wish we had time today to talk about it. Will you ask uour father what he thinks, and let us know his answer tomorrow?
    3. Unless you have a question about our discussion, please don't raise your hand.
    4. None of these is more appropriate than the original response.

2. Of the above responses, which one do you think would most likely be given by the majority of teachers in this room?

    1. Original response
    2. Q #1 Alternative #1
    3. Q #1 Alternative #2
    4. Q #1 Alternative #3

B. The teacher is leading a discussion which introduces a unit on seed germination. P Prior to this discussion period, the children had been given an opportunity to open and examine some bean seeds. They are now attempting to develop a list of the conditions they think are necessary for the seeds to sprout. One child suddenly asks, "Are all seeds like bean seeds?" The teacher replies, "That's a good question. We're going to talk about that later on in the unit."

3. Which of the following, if any, do you think would haveebeen a more appropriate response:

    1. What could we do to find out?
    2. All seeds are not alike. There are many different kinds.
    3. It tells about that in your textbook. Why don't you look it up?
    4. None of these is more appropriate than the original 5esponse.

4. Of the above responses, which one do you think would most likely be given by the majority of teachers in this room?

    1. Q #3 Alternative #1
    2. Q #3 Alternative #2
    3. Q #3 Alternative #3
    4. Q #3 Alternative #4

C. An incubator has been set up in the classroom. It is about time for the eggs to hatch; in fact, one of the chicks is trying to pick its way out through the shell. Several children have noticed this activity, and are casting excited glances in the direction of the incubator. However, it is the children's math period and the teacher is conducting a unit review in preparation for an examination which she plans to give tomorrow.

5. What should she do?

    1. Drape a cloth over the incubator and continue with the review.
    2. Tell the children that there are enough eggs so that some will still be hatching during their science period; drape a cloth over the incubator, and continue with the review.
    3. Postpone her plans for tomorrow's math examination and allow the children to gather around the incubator.
    4. Assign two children to keep an eye on the incubator while the others continue with the math review.

6. What do you think the majority of teachers in this room would do?

    1. Q #5 Alternative #1
    2. Q #5 Alternative #2
    3. Q #5 Alternative #3
    4. Q #5 Alternative #4

D. In order to encourage the children to speculate upon conditions on the lunar surface during an astronomy unit, the teacher has initiated a discussion of the problems that might be faced in trying to establish a lunar colony. One boy suddenly asks the teacher, "Do you think there is life on other planets?". The teacher replies, "That's an interesting question, what do you think?".

7. Which of the following, if any, do you think would have been a more appropriate response?

    1. "That's an interesting question, but no one really knows the answer."
    2. "That's an interesting question. Why don't you think about it some more, and I'll ask you to tell us your conclusions tomorrow."
    3. "That's an interesting question. I'm sorry that we haven't time to talk about it during this unit. Perhaps we can discuss it later on in the year if you'll remind me again.
    4. None of these are more appropriate than the original response.

8. Of the above given responses, which one do you think would most likely be given by the majority of the teachers in this room?

    1. Q #7 Alternative #1
    2. Q #7 Alternative #2
    3. Q #7 Alternative #3
    4. Q #7 Alternative #4

E. The children are conducting an activity in a unit on electricity. Each child has a flashlight battery, a small bulb, and several pieces of different materials to connect the two. They are trying to find out which materials will conduct an electrical current, and which will not. One child has arranged his materials in two groups: those that will make the bulb light when connected with the battery, and those that will not. He raises his hand and asks, "Why won't the bulb light when I use the materials in this group?". His teacher, who feels that a scientific answer is beyond the child's comprehension and really isn't sure she knows the scientific reason anyway, replies, "What do you think?".

9. Which of the following, if any, do you think would have been a more appropriate response?

1. The bulb won't light because these materials are all non-conductors.
2. That's a good question. I'm sorry, but I really don't know the answer.
3. It really isn't important that you know the reason now. When you're older, you'll understand why.
4. None of these is more appropriate than the original response.

10. Of the above responses, which one do you think would most likely be given by the majority of teachers in this room?

1. Q# 9 Alternative #1
2. Q# 9 Alternative #2
3. Q# 9 Alternative #3
4. Q# 9 Alternative #3

F. The teacher is demonstrating an electroscope for the class. After rubbing a vulcanite rod with a piece of wool, she touched the knob at the top of the electroscope with the rod. The leaves inside the electroscope spread apart. The teacher asks if anyone can explain this phenomenon. A child raises her hand and says, "You magnetized the leaves, and since like poles repel each other, the leaves spread apart.". The teacher replies, "No, it has nothing to do with magnetism. Does anyone else have an answer?".

11. Which of the following, if any, do you think would have been a more appropriate answer?

1. That seems reasonable. What could we do to find out if it is magnetism.
2. No, it's not magnetism, but you're close. Are there any other answers.
3. We've already covered magnetism. Does anyone else agree with this answer.
4. None of these is more appropriate than the original response.

12. Of the above responses, which one do you think would most likely be given by the majority of the teachers in this room.

1. Q# 11 Alternative #1
2. Q# 11 Alternative #2
3. Q# 11 Alternative #3
4. Q# 11 The original response

G. The children are making simple water-drop microscopes. A child complains that he can't see anything through his microscope.

13. What should the teacher do?

    1. Tell the child to make another microscope.
    2. Adjust the child's microscope for him.
    3. Tell the child to keep trying.
    4. Ask another pupil to help the child with his problem.

14. What do you think the majority of teachers in this room would do?

    1. Q #13 Alternative #1
    2. Q #13 Alternative #2
    3. Q #13 Alternative #3
    4. Q #13 Alternative #4

H. The children are weighing small objects with simple balances that each child has constructed. The teacher notices that the balance being used by one child is improperly constructed, and will give inaccurate results.

15. What should the teacher do?

    1. Nothing. The child will discover that something was wrong when he compares his results with his neighbor's.
    2. Tell the child that his balance isn't made right.
    3. Ask the child to describe how he made his balance.
    4. Say nothing, but correct the error in the child's balance.

16. What do you think the majority of teachers in this room would do?

    1. Q #15 Alternative #1
    2. Q #15 Alternative #2
    3. Q #15 Alternative #3
    4. Q #15 Alternative #4

J. Each child in a third grade class has been given a birthday candle and a piece of modeling clay with which to make a base. Their teacher has lighted the candles and asked the children to make a list of their observations of the candle as it burns. The teacher notices, however, that one child is watching two praying manti fighting in the class terrarium instead of his candle.

17. What should the teacher do?

    1. Nothing at this time.
    2. Reprimand the child and move his seat away from the terrarium.
    3. Take his candle away and make him copy the diagram of a candle from his text.
    4. Call the rest of the class over to see the activity in the terrarium.

18. What do you think the majority of the teachers in this room would do?

    1. Q #17 Alternative #1
    2. Q #17 Alternative #2
    3. Q #17 Alternative #3
    4. Q #17 Alternative #4

K. One day during a sixth grade science class one of the children interrupts the work of the class by asking the teacher, "Why do we have to study science?".

19. What should the teacher do?

1. Briefly explain, for the benefit of the whole class, why science is necessary and important.
2. Ignore the question and reprimand the child for interrupting the class.
3. Attempt to find out, either then or later, why the child asked this question.
4. Tell the child that she will answer the question after class.

20. What do you think the majority of teachers in this room would do?

1. Q #19 Alternative #1
2. Q #19 Alternative #2
3. Q #19 Alternative #3
4. Q #19 Alternative #4

L. The teacher is demonstrating a simple pendulum made from a fishing sinker suspended at the end of a piece of string. She has set the pendulum in motion and the class is watching it swing back and forth. To encourage speculation on the part of the children, the teacher asks, "What would happen if I shortened the string?". A child answers, "The sinker would swing faster.".

21. How should the teacher respond to this answer?

1. Let's use the correct name. This is called a pendulum.
2. That's right. Now, what would happen if I lengthened the string?
3. I'm sorry; that's wrong. Are there any other ideas?
4. That's one possibility. Are there any others?

22. How do you think the majority of teachers in this room would respond?

1.Q #21 Alternative #1
2.Q #21 Alternative #2
3. Q #21 Alternative #3
4. Q #21 Alternative #4

M. The teacher of a seccond grade class feels that it is about time to conclude a particular science unit. However, several pupils who have especially enjoyed the unit express a desire to continue it.

23. What should the teacher do?

1. Continue the unit for one more week.
2. Conclude the unit, explaining to these children that there are other units to cover and there just isn't time to continue this one any longer.
3. Allow these children to continue this unit while the others go on to the next.
4. Assist these children while they continue this unit on their own time, but also work in the next unit with the rest of the class.

24. What do you think the majority of the teachers in this room would do?

1. Q #23 Alternative #1
2. Q #23 Alternative #2
3. Q #23 Alternative #3
4. Q #23 Alternative #4

N. The class has been in a new science unit for about a week. Although this unit has been quite successful in other years, the children this year seem apathetic, indifferent, and passively uncooperative.

25. What should the teacher do?

    1. Discontinue the unit and begin the next one.
    2. Lay down the law and continue with the unit.
    3. Find out what the children would rather do; then do it.
    4. Take a period off to listen to the children express their feelings about the unit.

26. What do you think the majority of teachers in this room would do?

    1. Q #25 Alternative #1
    2. Q #25 Alternative #2
    3. Q #25 Alternative #3
    4. Q #25 Alternative #4

O. An intermediate grade class has just completed a science unit. The children have apparently enjoyed the activities and have done well in them. In order to measure the achievement of the children in this unit, the teacher has administered a final examination consisting of twenty-five objective items and one essay question. Surprisingly, most of the children did very well on the essay portion of the test, but very few passed the objective part.

27. What should the teacher do?

    1. Grade the children only on the basis of the essay part of the test.
    2. Review the unit with the children and then administer a revised form of the objective test.
    3. Average the two parts of the test as originally intended and proceed on to the next unit.
    4. Re-examine the total test to see if it actually measured what was taught during the unit.

28. What do you think the majority of teachers in this room would do?

    1. Q #27 Alternative #1
    2. Q #27 Alternative #2
    3. Q #27 Alternative #3
    4. Q #27 Alternative #4

P. A capable primary grade teacher would like to include a science period in her pupils' weekly schedule. A science text and a modest amount of materials are available for the pupils to use. However, since this is her first teaching assignment, and also because she has a very limited science background, the teacher is hesitant to do this.

29. What advice would you give this teacher?

    1. Don't do it. She will have enough to cope with in her first year of teaching without taking on any additional responsibilities.
    2. Introduce a science period now and then, but don't make it a regularly scheduled class period. Use the text as a basis for this program.
    3. Concentrate on the essential subjects, working science into these other areas when and if it seems to fit.
    4. Go ahead, but base the science program on pupil-motivated activities.

30. What advice do you think the majority of teachers in this room would give?

    1. Q #29 Alternative #1
    2. Q #29 Alternative #2
    3. Q #29 Alternative #3
    4. Q #29 Alternative #4

31. What advice would you give if this was an experienced, rather than a first year teacher?

    1. Q #29 Alternative #1
    2. Q #29 Alternative #2
    3. Q #29 Alternative #3
    4. Q #29 Alternative #4

32. What advice do you think the majority of teachers in this room would give to an experienced teacher with a limited science background?

    1. Q #29 Alternative #1
    2. Q #29 Alternative #2
    3. Q #29 Alternative #3
    4. Q #29 Alternative #4

Q. An experienced teacher in a new assignment finds that there is no science equipment available for use in a particular unit. She has taught this unit before, and would like to teach it again this year. However, she is told that money is not available to purchase the equipment.

33. What would you advise this teacher to do?

    1. Not teach the unit this year.
    2. Use the text, giving reading and written assignments.
    3. Make or have pupils make the necessary equipment.
    4. Have children bring in money to purchase the equipment.

34. What advice do you think a majority of teachers in this room would give?

    1. Q #33 Alternative #1
    2. Q #33 Alternative #2
    3. Q #33 Alternative #3
    4. Q #33 Alternative #4

R. An elementary teacher is told by her principal that she ought to include some science in her children's weekly schedule since it is so important in today's world. The teacher secretly agrees with the principal, but the reason for her previous failure to do this has been a fear of science.

35. If this was a primary grade teacher, what would be your advice to her?

    1. Give reading and writing assignments in the science text, at least until she has gained experience and confidence in the subject.
    2. Base the science program on pupil-motivated activities.
    3. Permit the faster pupils to engage independently in science activities while she gives remedial help in the essential subjects to the slower ones.
    4. Keep science to a minimum, while at the same time taking a strong subject-matter science course to strengthen her background.

36. What advice do you think the majority of teachers in this room would give to this primary grade teacher?

    1. Q #35 Alternative #1
    2. Q #35 Alternative #2
    3. Q #35 Alternative #3
    4. Q #35 Alternative #4

37. What advice do you think a majority teachers in this room would give to this primary grade teacher?

1. Q #35 Alternative #1	3. Q #35 Alternative #3
2. Q #35 Alternative #2	4. Q #35 Alternative #4

38. If this was an intermediate grade teacher , what would your advice be?

1. Q #35 Alternative #1	3. Q #35 Alternative #3
2. Q #35 Alternative #2	4. Q #35 Alternative #4

S. The teacher has planned a field trip with her pupils. However, as in the case of many field trips, poor weather may force a change in plans.

39. How should a teacher plan for this?

1. Prepare an alternative assignment to replace the trip.
2. Omit the science period for that day if the weather is poor.
3. Discuss with the class alternative activities to replace the trip should it have to be cancelled.
4. Take the trip anyway, but limit the planned activities to those which are not affected too much by the weather.

40. What do you think a majority of teachers in this room would do?

1. Q #39 Alternative #1	3. Q #39 Alternative #3
2. Q #39 Alternative #2	4. Q #39 Alternative #4

APPENDIX J

Item Analysis Data

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 1 ELEMENTARY SCIENCE TODAY

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	12	62	115	108	19	4	20	36	34	6
2	10	62	119	106	19	3	20	38	34	6
3	143	137	13	4	19	45	43	4	1	6
4	162	125	8	3	18	51	40	3	1	6
5	145	132	15	4	20	46	42	5	1	6
6	81	170	36	8	21	26	54	11	3	7
7	83	147	51	15	20	26	47	16	5	6
8	130	152	12	1	21	41	48	4	0	7
9	137	139	13	4	23	43	44	4	1	7
41	157	144	4	2	9	50	46	1	1	3
42	142	164	6	2	2	45	52	2	1	1
43	155	144	15	2	0	49	46	5	1	0
44	190	122	3	1	0	60	39	1	0	0
45	79	175	52	9	1	25	55	16	3	0
46	99	172	36	3	6	31	54	11	1	2
47	85	203	17	3	8	27	64	5	1	3
81	172	130	11	1	2	54	41	3	0	1
82	181	125	7	1	2	57	40	2	0	1
83	191	115	5	3	2	60	36	2	1	1
84	12	60	70	167	7	4	19	22	53	2
85	166	135	9	4	2	53	43	3	1	1
86	121	158	25	6	6	38	50	8	2	2
87	128	153	26	2	7	41	48	8	1	[illegible]
88	18	71	152	65	10	6	22	48	21	3
89	151	137	10	9	9	48	43	3	3	3
121	147	150	8	2	9	47	47	3	1	3
122	122	172	9	3	10	39	54	3	1	3
123	8	60	166	70	12	3	19	53	22	4
124	19	60	141	78	18	6	19	45	25	6

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 15 EVALUATING YOUR SCIENCE PROGRAM

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	4	38	110	27	10	2	20	58	14	5
2	3	25	121	29	11	2	13	64	15	6
3	36	119	19	3	12	19	63	10	2	6
4	41	121	12	3	12	22	64	6	2	6
5	35	122	17	1	14	19	65	9	1	7
6	34	123	15	2	15	18	65	8	1	8
7	38	128	10	1	12	20	68	5	1	6
8	43	130	6	2	8	23	69	3	1	4
9	49	126	4	3	7	26	67	2	2	4
41	51	135	3	0	0	27	71	2	0	0
42	43	135	2	0	9	23	71	1	0	5
43	40	122	8	0	19	21	65	4	0	10
44	35	115	10	0	29	19	61	5	0	15
45	26	96	41	3	23	14	51	22	2	12
46	31	110	20	3	25	16	58	11	2	13
47	27	130	15	1	16	14	69	8	1	8
81	41	126	8	0	14	22	67	4	0	7
82	43	121	10	0	15	23	64	5	0	8
83	35	111	9	1	33	19	59	5	1	17
84	7	34	97	18	33	4	18	51	10	17
85	36	118	8	1	26	19	62	4	1	14
86	19	101	28	6	35	10	53	15	3	19
87	31	98	25	2	33	16	52	13	1	17
88	9	38	93	15	34	5	20	49	8	18
89	38	110	14	0	27	20	58	7	0	14
121	43	86	12	2	46	23	46	6	1	24
122	36	97	5	1	50	19	51	3	1	26
123	6	32	90	14	47	3	17	48	7	25
124	7	46	69	13	54	4	24	[illegible]	7	29

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 14 NEW PROGRAMS IN ELEMENTARY SCIENCE

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	17	67	142	24	7	7	26	55	9	3
2	8	35	172	33	9	3	14	67	13	4
3	38	145	58	9	7	15	56	23	4	3
4	42	169	34	6	6	16	66	13	2	2
5	44	169	32	2	10	17	66	12	1	4
6	35	146	55	2	19	14	57	21	1	7
7	37	137	53	5	25	14	53	21	2	10
8	50	174	16	2	15	19	68	6	1	6
9	50	156	30	3	18	19	61	12	1	7
41	56	189	12	0	0	22	74	5	0	0
42	49	194	14	0	0	19	75	5	0	0
43	45	177	21	0	14	18	69	8	0	5
44	40	170	26	0	21	16	66	10	0	8
45	24	138	71	6	18	9	54	28	2	7
46	38	138	55	6	20	15	54	21	2	8
47	30	172	36	3	16	12	67	14	1	6
81	53	178	21	1	4	21	69	8	0	2
82	56	172	21	3	5	22	67	8	1	2
83	37	164	26	2	28	14	64	10	1	11
84	5	46	145	36	25	2	18	56	14	10
85	47	174	22	1	13	18	68	9	0	5
86	27	133	62	6	29	11	52	24	2	11
87	38	137	50	8	24	15	53	19	3	9
88	12	41	137	30	37	5	16	53	12	14
89	46	148	23	8	32	18	58	9	3	12
121	47	153	23	6	28	18	60	9	2	11
122	43	151	30	4	29	17	59	12	2	11
123	7	37	159	25	29	3	14	62	10	11
124	13	76	117	18	33	5	30	46	7	13

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 13 THE FIELD TRIP

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	8	37	159	46	5	3	15	62	18	2
2	6	40	161	43	5	2	16	63	17	2
3	53	185	13	0	4	21	73	5	0	2
4	53	185	9	1	7	21	73	4	0	3
5	53	176	16	4	6	21	69	6	2	2
6	47	176	22	1	9	18	69	9	0	4
7	50	171	23	1	10	20	67	9	0	4
8	50	189	5	0	11	20	74	2	0	4
9	54	175	8	1	17	21	69	3	0	7
41	62	190	2	1	0	24	75	1	0	0
42	53	194	5	1	2	21	76	2	0	1
43	53	187	9	1	5	21	73	4	0	2
44	50	181	13	1	10	20	71	5	0	4
45	41	137	66	5	6	16	54	26	2	2
46	53	186	11	1	4	21	73	4	0	2
47	38	190	14	0	13	15	75	5	0	5
81	62	178	8	1	6	24	70	3	0	2
82	69	164	13	2	7	27	64	5	1	3
83	50	177	14	1	13	20	69	5	0	5
84	7	52	143	42	11	3	20	56	16	4
85	58	167	18	1	11	23	65	7	0	4
86	38	163	39	3	12	15.	64	15	1	5
87	46	175	22	1	11	18	69	9	0	4
88	7	44	136	31	37	3	17	53	12	15
89	62	159	13	4	17	24	62	5	2	7
121	67	170	6	0	12	26	67	2	0	5
122	59	172	11	1	12	23	67	4	0	5
123	5	35	160	41	14	2	14	63	16	5
124	12	63	133	31	16	5	25	52	12	6

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 12 THE OUTDOOR LABORATORY

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	6	46	170	43	0	2	17	64	16	0
2	5	36	178	46	0	2	14	67	17	0
3	56	187	20	1	1	21	71	8	0	0
4	52	191	17	3	2	20	72	6	1	1
5	48	174	34	5	4	18	66	13	2	2
6	44	172	41	3	5	17	65	15	1	2
7	47	160	49	5	4	18	60	18	2	2
8	54	191	14	3	3	20	72	5	1	1
9	58	166	27	3	11	22	63	10	1	4
41	55	200	9	0	1	21	75	3	0	0
42	50	201	13	0	1	19	76	5	0	0
43	51	193	19	0	2	19	73	7	0	1
44	47	200	11	1	6	18	75	4	0	2
45	34	148	70	8	5	13	56	26	3	2
46	45	196	20	1	3	17	74	8	0	1
47	31	185	37	3	9	12	70	14	1	3
81	60	187	15	1	2	23	71	6	0	1
82	52	185	24	2	2	20	70	9	1	1
83	51	186	24	0	4	19	70	9	0	2
84	6	53	164	38	4	2	20	62	14	2
85	46	192	20	3	4	17	72	8	1	2
86	30	163	61	4	7	11	62	23	2	3
87	41	173	40	2	9	15	65	15	1	3
88	5	58	139	29	34	2	22	52	11	13
89	44	170	36	0	15	17	64	14	0	6
121	59	168	17	1	20	22	63	6	0	8
122	48	178	17	1	21	18	67	6	0	8
123	3	34	176	31	21	1	13	66	12	8
124	12	77	127	25	24	5	29	48	9	9

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 11 COLLECTING AND CLASSIFYING

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	4	43	170	55	1	1	16	62	20	0
2	5	40	176	51	1	2	15	64	19	0
3	71	187	14	1	0	26	68	5	0	0
4	72	181	17	2	1	26	66	6	1	0
5	61	194	12	3	3	22	71	4	1	1
6	54	184	32	2	1	20	67	12	1	0
7	51	183	33	4	2	19	67	12	1	1
8	63	189	13	4	4	23	69	5	1	1
9	73	167	21	6	6	27	61	8	2	2
41	74	189	7	1	2	27	69	3	0	1
42	62	203	8	0	0	23	74	3	0	0
43	66	202	5	0	0	24	74	2	0	0
44	70	197	6	0	0	26	72	2	0	0
45	37	159	68	5	4	14	58	25	2	1
46	57	195	16	2	3	21	71	6	1	1
47	44	201	18	4	6	16	74	7	1	2
81	82	183	7	1	0	30	67	3	0	0
82	83	176	8	5	1	30	64	3	2	0
83	70	187	8	5	3	26	68	3	2	1
84	6	47	159	58	3	2	17	58	21	1
85	65	186	15	4	3	24	68	5	1	1
86	38	176	46	3	10	14	64	17	1	4
87	49	188	22	3	11	18	69	8	1	4
88	10	53	154	33	23	4	19	56	12	8
89	65	173	14	5	16	24	63	5	2	6
121	63	177	13	2	18	23	65	5	1	7
122	48	195	9	2	19	18	71	3	1	7
123	3	34	180	37	19	1	12	66	14	7
124	13	71	139	29	21	5	26	51	11	8

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 10 CLASSROOM PLANTS AND ANIMALS

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	20	59	137	37	0	8	23	54	15	0
2	1	38	155	59	0	0	15	61	23	0
3	47	178	20	8	0	19	70	8	3	0
4	54	173	19	6	1	21	68	8	2	0
5	62	166	20	2	3	25	66	8	1	1
6	37	159	43	5	9	15	63	17	2	4
7	38	159	42	4	10	15	63	17	2	4
8	47	186	10	1	9	19	74	4	0	4
9	58	164	14	1	16	23	65	6	0	6
41	58	189	6	0	0	23	75	2	0	0
42	50	193	8	0	2	20	76	3	0	1
43	51	169	29	0	4	20	67	11	0	2
44	52	180	19	0	2	21	71	8	0	1
45	29	134	80	5	5	11	53	32	2	2
46	43	165	33	5	7	17	65	13	2	3
47	39	168	34	0	12	15	66	13	0	5
81	60	164	24	1	4	24	65	9	0	2
82	58	158	31	1	5	23	62	12	0	2
83	54	178	16	0	5	21	70	6	0	2
84	6	56	146	40	5	2	22	58	16	2
85	54	162	32	0	5	21	64	13	0	2
86	31	135	69	11	7	12	53	27	4	3
87	42	151	44	8	8	17	60	17	3	3
88	7	50	146	29	21	3	20	58	11	8
89	52	152	29	5	15	21	60	11	2	6
121	50	164	24	1	14	20	65	9	0	6
122	43	174	17	1	18	17	69	7	0	7
123	5	39	160	31	18	2	15	63	12	7
124	14	67	131	21	20	6	26	52	8	8

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 9 MODELS AND AUDIO VISUAL AIDS

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	10	30	152	70	1	4	11	58	27	0
2	8	32	150	72	1	3	12	57	27	0
3	83	169	7	3	1	32	64	3	1	0
4	78	173	8	3	1	30	66	3	1	0
5	75	175	10	2	1	29	67	4	1	0
6	71	167	15	1	9	27	63	6	0	3
7	63	170	17	3	10	24	65	6	1	4
8	72	173	7	0	11	27	66	3	0	4
9	98	146	4	1	14	37	56	2	0	5
41	85	176	2	0	0	32	67	1	0	0
42	69	192	1	1	0	26	73	0	0	0
43	72	186	4	1	0	27	71	2	0	0
44	75	178	9	0	1	29	68	3	0	0
45	42	156	55	6	4	16	59	21	2	2
46	70	180	8	0	5	27	68	3	0	2
47	63	179	10	3	8	24	68	4	1	3
81	84	170	6	1	2	32	65	2	0	1
82	84	170	6	1	2	32	65	2	0	1
83	74	169	16	1	3	28	64	6	0	1
84	7	54	146	54	2	3	21	56	21	1
85	58	174	24	4	3	22	66	9	2	1
86	47	154	47	11	4	18	59	18	4	2
87	58	178	19	3	5	22	68	7	1	2
88	8	39	165	42	9	3	15	63	16	3
89	81	162	6	4	10	31	62	2	2	4
121	88	156	7	1	11	33	59	3	0	4
122	63	172	15	1	12	24	65	6	0	5
123	6	31	171	40	15	2	12	65	15	6
124	26	56	130	36	15	10	21	49	14	6

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

SESSION 8 EVALUATING PUPIL PROGRESS

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	52	76	85	33	15	20	29	33	13	6
2	5	36	133	72	15	2	14	51	28	6
3	30	111	83	28	9	11	43	32	11	3
4	27	121	80	25	8	10	46	31	10	3
5	29	133	61	25	13	11	51	23	10	5
6	24	106	86	25	20	9	41	33	10	8
7	27	111	75	23	25	10	43	29	9	10
8	40	158	40	11	12	15	61	15	4	5
9	44	128	58	21	10	17	49	22	8	4
41	64	180	12	3	2	25	69	5	1	1
42	50	195	11	3	2	19	75	4	1	1
43	43	157	46	12	3	16	60	18	5	1
44	38	159	33	6	25	15	61	13	2	10
45	20	128	76	21	16	8	49	29	8	6
46	31	127	70	17	16	12	49	27	7	6
47	19	152	59	17	14	7	58	23	7	5
81	49	143	36	13	20	19	55	14	5	8
82	42	138	46	12	23	16	53	18	5	9
83	42	153	22	6	38	16	59	8	2	15
84	4	54	129	39	35	2	21	49	15	13
85	40	162	27	8	24	15	62	10	3	9
86	18	103	79	22	39	7	39	30	8	15
87	29	106	74	14	38	11	41	28	5	15
88	13	54	134	27	33	5	21	51	10	13
89	35	122	51	18	35	13	47	20	7	13
121	35	130	42	14	40	13	50	16	5	15
122	37	151	26	6	41	14	58	10	2	16
123	5	42	142	30	42	2	16	54	11	16
124	23	72	107	17	42	9	28	41	7	16

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 7 SUPPLEMENTING DIRECT EXPERIENCES

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	12	64	130	47	1	5	25	51	19	0
2	9	37	155	53	0	4	15	61	21	0
3	45	152	48	9	0	18	60	19	4	0
4	43	175	30	6	0	17	69	12	2	0
5	33	120	66	29	6	13	47	26	11	2
6	29	132	75	15	3	11	52	30	6	1
7	32	149	53	16	4	13	59	21	6	2
8	40	158	40	12	4	16	62	16	5	2
9	36	127	59	23	9	14	50	23	9	4
41	46	181	20	6	1	18	71	8	2	0
42	41	176	31	4	2	16	69	12	2	1
43	48	172	23	4	7	19	68	9	2	3
44	51	165	25	8	5	20	65	10	3	2
45	32	134	70	11	7	13	53	28	4	3
46	40	154	41	7	12	16	61	16	3	5
47	27	151	47	10	19	11	59	19	4	7
81	56	165	20	7	6	22	65	8	3	2
82	53	164	26	5	6	21	65	10	2	2
83	50	168	26	3	7	20	66	10	1	3
84	8	44	147	49	6	3	17	58	19	2
85	54	169	21	1	9	21	67	8	0	4
86	34	141	60	8	11	13	56	24	3	4
87	42	147	48	8	9	17	58	19	3	4
88	8	57	141	33	15	3	22	56	13	6
89	48	145	32	9	20	19	57	13	4	8
121	44	162	29	9	10	17	64	11	4	4
122	43	171	25	5	10	17	67	10	2	4
123	5	39	174	25	11	2	15	69	10	4
124	19	68	131	24	12	7	27	52	9	5

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 6 CONDUCTING EXPERIMENTS

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	21	57	127	38	0	9	23	52	16	0
2	6	41	146	50	0	2	17	60	21	0
3	47	155	35	6	0	19	64	14	2	0
4	51	165	22	5	0	21	68	9	2	0
5	49	136	46	7	5	20	56	19	3	2
6	44	148	38	6	7	18	61	16	2	3
7	40	143	47	8	5	16	59	19	3	2
8	54	159	19	6	5	22	65	8	2	2
9	55	144	27	8	9	23	59	11	3	4
41	59	166	17	1	0	24	68	7	0	0
42	49	175	17	2	0	20	72	7	1	0
43	53	158	26	5	1	22	65	11	2	0
44	51	169	16	6	1	21	70	7	2	0
45	30	127	74	10	2	12	52	30	4	1
46	41	145	47	6	4	17	60	19	2	2
47	27	152	44	8	12	11	63	18	3	5
81	57	155	21	2	8	23	64	9	1	3
82	55	149	29	2	8	23	61	12	1	3
83	53	153	26	2	9	22	63	11	1	4
84	20	71	115	27	10	8	29	47	11	4
85	54	150	29	0	10	22	62	12	0	4
86	22	135	59	17	10	9	56	24	7	4
87	33	143	48	9	10	14	59	20	4	4
88	9	52	144	27	11	4	21	59	11	5
89	45	133	42	8	15	19	55	17	3	[illegible]
121	40	146	40	7	10	16	60	16	3	4
122	40	172	19	2	10	16	71	8	1	4
123	8	33	166	25	11	3	14	68	10	5
124	17	76	122	17	11	7	31	50	7	5

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 5 MEASUREMENT-ANOTHER SKILL

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	20	60	140	49	13	7	21	50	17	5
2	9	35	164	62	12	3	12	58	22	4
3	61	177	28	4	12	22	63	10	1	4
4	62	179	25	3	13	22	63	9	1	5
5	49	182	19	10	22	17	65	7	4	8
6	41	174	41	4	22	15	62	15	1	8
7	46	164	47	5	20	16	58	17	2	7
8	63	186	9	6	18	22	66	3	2	6
9	61	168	22	6	25	22	60	8	2	9
41	70	183	17	2	10	25	65	6	1	4
42	56	207	13	3	3	20	73	5	1	1
43	69	175	27	9	2	24	62	10	3	1
44	62	186	25	5	4	22	66	9	2	1
45	27	164	75	10	6	10	58	27	4	2
46	46	188	30	4	14	16	67	11	1	5
47	34	172	46	11	19	12	61	16	4	7
81	80	176	16	7	3	28	62	6	2	1
82	77	178	17	7	3	27	63	6	2	1
83	65	178	28	8	3	23	63	10	3	1
84	19	65	142	53	3	7	23	50	19	1
85	63	182	27	7	3	22	65	10	2	1
86	31	163	61	16	11	11	58	22	6	4
87	41	174	46	8	13	15	62	16	3	5
88	7	45	171	44	15	2	16	61	16	5
89	46	174	33	10	19	16	62	12	4	7
121	47	183	24	6	22	17	65	9	2	8
122	50	185	21	4	22	18	66	7	1	8
123	7	29	179	42	25	2	10	63	15	9
124	16	75	141	23	27	6	27	50	8	10

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 4 OBSERVATION-A SCIENCE SKILL

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	6	34	133	69	1	2	14	55	28	0
2	3	35	129	74	2	1	14	53	30	1
3	86	146	7	3	1	35	60	3	1	0
4	81	152	7	2	1	33	63	3	1	0
5	58	144	28	11	2	24	59	12	5	1
6	59	148	23	6	7	24	61	9	2	3
7	54	148	32	5	4	22	61	13	2	2
8	73	158	7	1	4	30	65	3	0	2
9	85	144	3	5	6	35	59	1	2	2
41	71	162	9	0	1	29	67	4	0	0
42	62	170	9	1	1	26	70	4	0	0
43	67	154	21	1	0	28	63	9	0	0
44	70	162	11	0	0	29	67	5	0	0
45	36	147	49	10	1	15	60	20	4	0
46	56	156	24	2	5	23	64	10	1	2
47	48	156	27	7	5	20	64	11	3	2
81	76	148	14	2	3	31	61	6	1	1
82	80	147	11	2	3	33	60	5	1	1
83	79	150	10	1	3	33	62	4	0	1
84	15	37	123	64	4	6	15	51	26	2
85	66	151	20	3	3	27	62	8	1	1
86	41	153	33	7	9	17	63	14	3	4
87	48	148	32	5	10	20	61	13	2	4
88	11	55	132	35	10	5	23	54	14	4
89	68	141	14	4	16	28	58	6	2	7
121	68	144	13	2	16	28	59	5	1	7
122	57	152	15	2	17	23	63	6	1	7
123	4	34	153	35	17	2	14	63	14	7
124	18	47	129	30	19	7	19	53	12	8

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

LESSON 3 PLANNING SCIENCE ACTIVITES

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	23	67	131	73	1	8	23	44	25	0
2	6	45	150	91	3	2	15	51	31	1
3	69	155	58	12	1	23	53	20	4	0
4	84	178	25	7	1	28	60	8	2	0
5	67	162	44	18	4	23	55	15	6	1
6	48	159	71	12	5	16	54	24	4	2
7	49	140	81	21	4	17	47	27	7	1
8	76	175	33	7	4	26	59	11	2	1
9	78	162	34	13	8	26	55	12	4	3
41	80	174	30	10	1	27	59	10	3	0
42	69	197	20	8	1	23	67	7	3	0
43	56	152	64	20	3	19	52	22	7	1
44	64	158	52	19	2	22	54	18	6	1
45	41	172	59	20	3	14	58	20	7	1
46	54	171	46	12	12	18	58	16	4	4
47	40	146	63	29	17	14	49	21	10	6
81	82	145	46	18	4	28	49	16	6	1
82	72	162	41	16	4	24	55	14	5	1
83	89	148	41	11	6	30	50	14	4	2
84	20	70	124	65	16	7	24	42	22	5
85	78	155	39	16	7	26	53	13	5	2
86	50	145	63	25	12	17	49	21	8	4
87	58	163	48	17	9	20	55	16	6	3
88	15	48	168	50	14	5	16	57	17	5
89	61	147	48	21	18	21	50	16	7	6
121	79	155	26	13	22	27	53	9	4	7
122	55	173	30	13	24	19	59	10	4	8
123	7	42	163	59	24	2	14	55	20	8
124	32	71	125	39	28	11	24	42	13	9

COURSE EVALUATION SURVEY
SCIENCE FOR ELEMENTARY TEACHERS

ESSON 2 ACTIVITY-CENTERED SCIENCE

	NUMBER OF CASES					PERCENT OF GROUP				
	RESPONSE					RESPONSE				
QUESTION	1	2	3	4	OMIT	1	2	3	4	OMIT
1	3	45	125	94	9	1	16	45	34	3
2	9	32	125	98	12	3	12	45	36	4
3	93	154	14	4	11	34	56	5	1	4
4	90	154	15	3	14	33	56	5	1	5
5	93	153	13	4	13	34	55	5	1	5
6	53	150	45	10	18	19	54	16	4	7
7	47	144	59	10	16	17	52	21	4	6
8	82	167	8	5	14	30	61	3	2	5
9	87	145	18	6	20	32	53	7	2	7
41	93	162	13	3	5	34	59	5	1	2
42	87	179	6	2	2	32	65	2	1	1
43	76	174	22	4	0	28	63	8	1	0
44	83	175	16	2	0	30	63	6	1	0
45	42	177	53	2	2	15	64	19	1	1
46	68	187	16	1	4	25	68	6	0	1
47	54	176	30	7	9	20	64	11	3	3
81	104	155	15	2	0	38	56	5	1	0
82	89	168	16	3	0	32	61	6	1	0
83	96	155	20	4	1	35	56	7	1	0
84	15	50	113	95	3	5	18	41	34	1
85	67	174	22	10	3	24	63	8	4	1
86	57	165	44	5	5	21	60	16	2	2
87	66	185	15	5	5	24	67	5	2	2
88	16	51	148	56	5	6	18	54	20	2
89	89	160	9	6	12	32	58	3	2	4
121	103	162	4	1	6	37	59	1	0	2
122	61	173	28	8	6	22	63	10	3	2
123	12	33	155	70	6	4	12	56	25	2
124	19	60	139	51	7	7	22	50	18	3